NINTH ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1882.

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &c.

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.
1883.

NINTH ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1882.

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.
1883.

1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
			$47,141,713		

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of Miners employed; and their average earnings per man, per year, from 1858 to 1882.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months.)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
			$47,141,713		

REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR 1882.

To the Honourable CLEMENT F. CORNWALL, *Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

I have the honour herewith to respectfully submit the Ninth Annual Report of the Mining Industries of the Province.

JOHN ROBSON,
Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,
23rd February, 1883.

REPORT

GOLD.

The value of the amounts exported by the Banks during the year 1882 is as follows:—

Bank of British Columbia	$237,983
Bank of British North America	181,071
Garesche, Green & Co	376,017
	$795,071

This is a decrease of nearly $80,000, compared with the Bank export of 1881. The number of men, however, engaged in this industry has declined in about the same proportion, for the average yearly earnings per man are very closely approximate for the two years.

CARIBOO.

Although the yield of gold in this district fell off considerably during the past year, it is gratifying to find that a spirit of cheerfulness and hope pervades the comprehensive report of the Gold Commissioner.

The sum voted at the last session of the Legislature for explorations has, so far as the portion appropriated to Cariboo is concerned, already borne some fruit. Prospecting, other than surface and outside of the well-known gold bearing creeks, had almost become a thing of the past. It has now received a stimulus which will certainly last during the coming season, independently of the success or failure of any particular work now being prosecuted.

The interesting report of Messrs. Petrie, McDonald, Porter, and Johns is herewith published. They evidentlly have faith in Ollalie Creek, and the nature of the ground apparently fulfils the conditions considered favourable by those experienced in the deep diggings of Cariboo. Unless driven out by water at a lower level, the result ought soon to be known; if a successful one, another mining division will have been added to the district.

A report from Messrs. Johnston and Macdonald, who likewise received a portion of the Government grant, is also published. They travelled over the section of country lying to the north of Sugar Creek, but were not in a position to do other than surface prospecting. They found favourable indications of gold, and are of opinion that a creek they discovered is worth being thoroughly tested.

Messrs. Foster and Paris, who were also assisted out of the vote for explorations, travelled down Willow River for a distance of about forty miles below Barkerville. Like the party last mentioned, they were not prepared to sink, and their expedition was without result.

Messrs. Pearce and Bennett, the fourth party assisted in their outfit by the Government, found paying diggings on a tributary of Cunningham Creek. This discovery tends to confirm the opinion that Cariboo has, so far, been only partially prospected, for Cunningham Creek has been well-known for more than twenty years.

MR. BOWRON'S REPORT.

"RICHFIELD, 27th Nov., 1882.

"SIR,—In pursuance of request in your circular of 13th September last, I have the honour to enclose forms containing mining statistics of the district for the present year, and submit the following report in connection therewith.

"From a reference to the accompanying statistics it will be seen that a marked decrease in the annual gold product has taken place, a result that has caused much disappointment among the miners generally, but more especially among those companies who, for the past year or two, have been preparing to work their claims by hydraulic process. Not that their claims have been proven non-remunerative, but simply from the fact that this system of mining is comparatively new to Cariboo and, consequently, the time, trouble and expense necessary to put such claims in proper working order has been under-estimated.

"Another cause of the decrease in the yield will be found in the decreased number of men employed. The statistics shew that our white mining population number about seventy-five less than in 1881, which is accounted for by the demand for skilled white labour upon the railroad works.

"The Chinese, who now out-number the white population of the district about two to one, very naturally again make the best showing, as, while many of the white men are either prospecting or erecting new and elaborate machinery to work their mines, the Chinaman, on the contrary, is busy with his sluice-box or rocker, every day adding something to the general output.

"On Williams Creek the Bed-rock Flume Co. have not done any work the present season. The old Downie & Bradley Nicholson Co., situated about three-quarters of a mile above Richfield, and now in the hands of Chinese, admit taking out $16,000 the past season. This claim has been worked continuously for eighteen years and still has every appearance of being good for years to come. The Boneta Co., situated immediately above the old Black Jack claim, appear to have found a back channel from which very good pay was taken during the season.

"The gentlemen to whom a conditional lease of the abandoned ground below the cañon was promised last year, having been unsuccessful in their endeavours to induce capitalists to take hold of the enterprise, have surrendered their right to the lease, and the ground, or a portion of it, has been located by miners, who are now engaged running a drain to open up the same and expect to be taking out gold shortly.

"The Waverly Hydraulic Co., of Grouse Creek, lost the greater part of the season by reason of their tunnel, through which their claim is being opened, getting choked with gravel and dirt, which filled the cut above with water to a depth of some ninety feet. This necessitated considerable delay, as it was deemed too hazardous an undertaking to attempt opening the tunnel while that pressure of water remained, and the greater part of the season was lost before the claim was opened for work.

"The Sugar Creek Hydraulic Co. have progressed satisfactorily with their work, having reached pay dirt and washed out about $2,000. The owners feel confident of being able to make it profitable in the future.

"The Glamorgan Co., of New Creek, who have been running a tunnel through very bad ground for the greater part of the past two years, lately sank a blind shaft in their tunnel and obtained what they consider paying prospects. They are now about to put up machinery and expect to be taking out pay in about two months hence. Other claims have been located, both above and below, on this creek.

"On Antler Creek, the Yellow Lion Co., situated below the old McBean Bench and in the pass leading towards Cunningham Creek, about a year ago found gold on the bed-rock within a few feet of the surface, and followed it into a channel from twenty-five to thirty feet deep, which appears to run towards Cunningham Creek. This claim has paid well the whole season, and would indicate that the Antler lead, from this point, runs through the pass towards Cunningham Creek, a distance of some three miles, and which up to the present time remains unprospected. The benches on the lower end of Antler Creek, worked principally by Chinese, have paid fairly well during the past summer.

"On Lightning Creek but little new work has been undertaken. The hydraulic companies' works on Dunbar Flat are not in a sufficiently advanced state to test the productiveness of their mines.

"From Last Chance Creek, which was worked and paid handsomely in years past, but latterly entirely abandoned, Messrs. J. Holmes and George McLeod have obtained excellent prospects about one mile from its mouth. They exhibited a beautiful sample of gold, one piece of which weighed over an ounce, and, on application, were granted discovery claims. At present writing it is impossible to form an opinion as to the extent or value of this discovery.

"The bars and benches on the Fraser and Quesnelle Rivers have been less productive than in 1880 and 1881. There have, however, been a less number engaged, and those principally Chinese. Mr. St. Laurent, Collector at Quesnelle, reports the discovery, by Chinese, of some new mines about thirty miles up Quesnelle River, some twenty of whom have taken up supplies and will remain there during the winter.

"The limited sum of money, from the vote of last session, placed at my disposal for exploration purposes has, I believe, after consultation with the members from this district, been most judiciously expended. Four different parties were assisted in purchasing their outfit, three of whom have handed in reports which will be found hereunto annexed. Whatever

the ultimate result of these discoveries may be, at present we can only conjecture. I must, however, say that the representations made by these different parties have evoked much enthusiasm here among all classes; and two parties, one of four and another of six men, will be kept out all winter, prospecting for deep diggings, on creeks discovered the past season, and believed to contain gold in paying quantities on the clay.

"One party of four men, under Mr. Hilton, have already started with some 2,800 lbs. of supplies, furnished by the traders, farmers, and miners of the district, to prosecute researches on a creek about 45 miles north of Cottonwood Bridge. This creek was discovered by Messrs. Hilton and North, last summer, and named Alder Creek. They took out between five and six ounces of gold on top of the clay, and have returned there again to reach bed-rock, if possible.

"Another party of six men proceed at once to Porter Creek, about 45 miles south of Barkerville, and will endeavour to reach bed-rock on that creek.

"Messrs. S. Pearce and W. Bennett, who also received assistance in their outfit from the exploration fund, discovered a small gulch putting into Cunningham Creek, which will pay fair wages. The discoverers have built themselves a cabin, and will work there the coming season. Two companies have recorded ground on the stream, which has been named Pearce's Gulch.

"One observable feature in the reports of the parties who have been out exploring the past season, is the number of favourable-looking creeks and gulches found, upon which no appearance of previous prospecting was seen. This renders it most desirable that one or two parties, of say four men each, should be kept out during the coming summer, and any assistance made by the Government towards this end would, I think, judging from the action taken the present season, be most liberally supplemented by the people of this district.

"There was melted at the Government Assay Office, Barkerville, $194,142 30 for the eleven months of present year. I estimate the total yield of gold for the district, exclusive of Omineca, for 1882, as follows:—

Barkerville Division	$180,500
Lightning Creek Division	85,595
Quesnelle Division	71,610
Keithley Division	98,820
Estimated amount of which no account was obtained	20,000
Estimated yield throughout district from date of collecting statistics till 31st December	15,000
	$471,525

"With the exception of some tunnel work on Burns' Mountain, no prospecting for quartz was done. Samples of quartz taken from a ledge found on one of the tributaries of Willow River by Foster and Paris, assayed at the Government Assay Office $15 07 per ton of 2,000 lbs., with traces of silver. I have, &c.,

(Signed) "JNO. BOWRON,
"*Gold Commissioner.*

"*To the Hon. the Provincial Secretary and Minister of Mines.*"

MR. STEPHENSON'S REPORT.

FORKS QUESNELLE, 15th November, 1882.

"SIR,—I have the honour to forward herewith the mining statistics for Keithley Division, Cariboo District. Although I have been as careful as possible in collecting information, I must acknowledge a serious falling off from last year's yield of gold in nearly all the different sections of this division.

"The unprecedented high waters of this season, certainly did in many instances retard work, and on Keithley Creek did considerable damage to several of the creek claims. But upon the other hand for hydraulic and ground sluicing claims, where plenty of water is needed, the season has been unusually good for a plentiful supply.

"As yet there is very little hydraulic mining in this section, chiefly owing to heavy outlay necessary to get water upon the benches that would pay to be worked as hydraulic claims.

"The river mining has been greatly retarded by the water keeping at a high stage until late in the season, thereby causing quite a number of Chinamen to go down the country who,

had the water been as low as usual at the time of the year, would have been mining upon the river bars until the cold weather set in; but this season the cold weather has come before the water has gone down, therefore, we have very little river mining this fall.

"On the Fraser River, from Quesnelle to Soda Creek, there are comparatively few miners this year, they having apparently worked out the diggings found last year without any new discoveries for the current year.

"I have, &c.,
(Signed) "W. STEPHENSON,
"*Government Agent.*

"*To the Honourable the Minister of Mines, Victoria, B. C.*"

REPORT OF MESSRS. PETRIE, MCDONALD, JOHNS AND PORTER.

To the Commissioner of Cariboo District:

"SIR,—We, the undersigned, having received a portion of the Government fund for exploration purposes, beg leave to submit the following report which contains a summary of our proceedings since 15th August last:—On that date we left Barkerville and proceeded south over Bald Mountain until we struck Swift River and its tributaries. Here we found small prospects on the surface; but as we were not prepared to sink for deep diggings, continued our way in a southerly direction across the divide between Swift River and the main Quesnelle.

"On the south side of the divide we found a very large quartz ledge from 15 to 20 feet in width with well defined walls. The ledge runs in a N.E. and S.W. direction and is traceable on the surface for over 700 feet, the croppings in places rising 10 feet above the ground. It is so situated on the side of the mountain that we judged a tunnel run in a distance of 500 feet would tap the ledge 1000 feet from the surface.

"On the south side of the divide we found a section of country, which heretofore seemed to have been entirely overlooked. We found one large stream to which has been given the name of Porter Creek, having a number of small tributaries, upon several of which we found gold upon the clay. We made an attempt to sink on one of these, but for lack of windlass and rope, could only get down about 18 feet. This stream empties into Porter Creek about a mile from where we were sinking. Subsequently we ascertained that Porter Creek empties into Swift River about five, or perhaps six, miles below where we were working.

"In the meantime our supply of provisions was getting exhausted, but fortunately one of our party about this time killed a cariboo, and as grouse were very plentiful we prolonged our stay several days, and found that on Porter Creek the valley in places is over a mile in width, that small prospects could be found over the whole of this distance, which confirmed us in the belief, that we had found a favourable field to prospect in, and we determined as our provisions were exhausted to return to Barkerville and refit ourselves again, and come back to test the deep ground. Accordingly we started back, and reached Barkerville on the 23rd September. Receiving further aid, we started back again, on the 28th, provided with rope, windlass, buckets, &c. In order to get through with horses and pack animals, we were obliged to go by way of Stanley, following the old Swift River trail for about 15 miles, and then cutting our way through the timber the remainder of the distance. This occupied us ten days, and as the cold weather was setting in we had to build ourselves a cabin, which took eight days more. We then commenced sinking a new shaft about fifty feet from the old one which we had left at 18 feet deep, and continued sinking until the 21st November, having reached a depth of 56 feet, when we were again obliged to return to Barkerville for more supplies.

"The shaft is well and securely timbered. The ground is for the first few feet gravel, then about 10 feet clay, then more gravel for about 30 feet, after which, comes a hard dry slum to bottom.

"The sinking is pretty good (hard and dry); we can only conjecture as to depth to bed-rock, but think it will not exceed 25 feet from where we left off. We have named this creek Ollalie Creek.

"As the Government fund for exploration is exhausted, as well as our own individual resources, we have made an appeal to the general public for assistance, and have met with such

a generous response that we intend returning again in a few days to continue sinking, if possible, our shaft to bed-rock.

"We have the honour, &c.,

Signed "FRANK PETRIE,
" "ALEX. MCDONALD,
" "ALEXANDER PORTER,
" "SILAS JOHNS.

"*Barkerville, B. C., 30th November, 1882.*"

MESSRS. JOHNSTON AND MCDONALD'S REPORT.

"*To John Bowron, Gold Commissioner, Richfield:*

"SIR,—We beg to report the result of our prospecting tour to the north of Sugar Creek:—

"Starting from Sugar Creek on the 15th August, we went down Valley Creek twenty miles, then went north-west to Stone Lake Valley, a distance of ten miles. We then struck a creek, about the size of Stouts Gulch, running to the east, on which we sunk three prospect holes and got colours of gold in each, but not enough to pay. We did not get bed-rock on this creek. We then went on about four miles in a north-west direction and struck another creek of about the same size, and sunk several holes on it with the same result. We then went on about one mile further, and found a large stream, larger than Williams Creek. We found bed-rock at the upper end of this creek, but found no gold; this creek runs east. We then went across the mountain in a westerly direction, about ten miles, and came on Willow River; followed Willow River about three miles and struck another creek emptying into it from the north. On this creek we found a cañon and did some prospecting, getting colours of gold. This is a good looking creek, but it would take considerable work to properly prospect. There are several quartz ledges crossing it—the kind of quartz found on Lowhee Creek. We think the creek worth a thorough prospecting. We went on four miles to another creek about as large as Williams Creek, on which we found prospects of fine gold, and started a ground sluice. Got a cut in about five feet, when we came on a soft mud or slum; we drove down a pole into it about twelve feet and concluded we could not bottom and gave it up. There is no quartz or slate rock to be seen on this creek. We went on to another creek about four miles, but found it small and worthless looking, therefore did not stop to prospect it. We then came back up Willow River to the creek where the quartz and slate was found. Crossed Willow River and came on a creek upon which we obtained a good prospect, in one pan about ten cents, but it did not hold out.

"We then started for home, and on the way prospected some of the bars on Willow River. We got fine gold, but whether in sufficient quantities to pay we are uncertain; although gold was obtained in every pan we tried. Coming up Valley Creek to within four miles of Sugar Creek, we prospected on a creek which puts into the former from the south, finding nothing.

"We also prospected on a creek between Sugar and Mustang Creeks, but did not find the channel, as there was no wash where we sunk.

"We then returned to Sugar Creek, where we arrived on the 17th September.

"The country through which we travelled is very favourable looking for gold, but it would require a larger force of men to sink.

"Yours, &c.,

(Signed) "A. JOHNSTON,
" "ALEX. MCDONALD.

"*Barkerville, October 11th, 1882.*"

CASSIAR.

MR. VOWELL'S REPORT.

"CASSIAR, B. C., 24th October, 1882.

"SIR,—I have the honour, herewith, to forward for the information of the Government, the mining statistics for 1882, and such other particulars in reference to my district as may be of importance, viz.:—

"Since my last report, dated the 18th July, 1882, a slight improvement has taken place in mining prospects throughout the district.

"The output of gold for 1882 has been fair, and compares favourably with that of last year, when there were nearly twice the number engaged in mining as have been at Cassiar during the present year.

"On McDames Creek there was a decided improvement during the latter portion of the season, and on Thiberts Creek several hill claims have proved highly remunerative, while others are being opened with the intention of prospecting, etc., during the winter months.

"Dease Creek has not done much, but all *hope*, as regards the richness of its *hills*, has not been yet abandoned, several companies being determined to carry on prospecting in that locality next year.

"Those who have been mining on the Liard—some twenty in all—are very well satisfied with their season's work, and some Chinese and others have done so well on Walker's Creek as to induce them to return next year with many of their friends.

"In going down the Liard River last spring, the Chinese lost one boat with four Chinamen and the boat load of provisions.

"Estimate of the general yield of gold during past season is as follows:—

"McDames Creek section	$72,700
"Dease and Thiberts section	80,100
"Yukon, Takoo and Stickeen	30,000
"Total,	$182,800

"The last entry ($30,000) is mere guess work, no returns having been received from the last mentioned places. * * * * * *

"About one hundred and fifty souls, exclusive of Indians, intend to pass the coming winter in these mines; of these, some 30 white men and 40 Chinese remain at McDames Creek, 28 white men on Thiberts Creek, 6 white men and 25 Chinese at Dease Creek, and about 20 white men on the Stickeen. * * *

"I have &c.,

(Signed) "A. W. VOWELL,

"*Gold Commissioner and Stipendiary Magistrate, Cassiar.*

"*The Hon. the Provincial Secretary, Victoria, B. C.*"

LILLOOET.

LILLOOET DIVISION.

MR. PHAIR'S REPORT.

"LILLOOET, 18th November, 1882.

"SIR,—In compliance with the request contained in your circular letter of the 13th September last, I have the honour to forward herewith the mining statistics for the Lillooet Division of Lillooet District for the year 1882.

"No new discoveries of gold have been made the past season, nor any prospecting done except on Bridge River and its south tributary. On the latter, a company of four men put in a wing-dam and obtained a very fair prospect. They got $13 in coarse gold from a hole 4 feet by 11 feet and 6 feet in depth, which was chiefly on the bed-rock. It was, however, too late in the season to test the creek thoroughly, but they intend returning early next spring.

"They told me the creek is easily wing-dammed, and that there is plenty of good timber adjacent to it.

"It is on this south branch that Indian Hunter Jack, whom I mentioned in my last report, has a claim recorded, and which paid him very well during the past season. Thirteen Indians have just returned from there, none of whom had less than $30 in gold dust.

"The journey can be made in three or four days from this town. The route is by Seaton Lake, thence across the mountain, which is very steep and without a trail. Indians will not pack supplies for less than 5 cents a pound.

"There are many creeks in the vicinity of this one, which, from what I can learn, were never thoroughly prospected,

"The amount of gold bought here this year was $9,270 less than last year.
"The total yield for the past season is about $30,415.

"I have, &c.,
(Signed) "C. PHAIR,
"*Government Agent.*

"*To the Hon. the Minister of Mines, &c., Victoria.*"

CLINTON DIVISION.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE, CLINTON,
"28th October, 1882.

"SIR,—I have the honour to enclose herewith the mining statistics for the year 1882, for the upper portion of Lillooet District, extending from Leons Creek on the south to the mouth of Chilcoaten River on the north, a distance of about 60 miles. With the exception of 4 white men, the whole of the gold mining, in this portion of the district, may be said to be done by Chinese, and it is therefore simply impossible to get at anything like a correct return of the total annual yield. The sources from which I have obtained my information are the merchants and other buyers of gold, and I have no reason to doubt the correctness of their statements.

"The total amount which I have to report from these sources is $25,380. This amount is somewhat under the total of last year, but I am satisfied the yield—could it be ascertained—would be in excess of last year, from the fact that a much larger number than usual of wandering and non-registered Chinese miners have been at work in this district this year. I estimate the amount of gold taken out by this class, at least equal to one-third of the actual figures obtained from reliable sources.

"I have no new discoveries to report for this section. Mining was again tried this year on Scotty's Creek, a tributary of Bonaparte River. The gold, of a fine quality, is found in the bed of the creek, but the impediments in the way, in the form of large boulders, are insurmountable unless backed by capital. The water power is excellent, and with a properly constructed flume which would involve considerable outlay, these obstacles could be removed.

"I regret exceedingly again to report, no work done this year on the Big Slide Lode. Mr. Foster, so far, has been unsuccessful in making arrangements for the working of his claim on that lode. Science in this particular case is still behind the requirements of the age. The precious metal is, without a shadow of a doubt, in the ore, but the question, how is it to be profitably extracted, still remains unsolved.

"I have, &c.,
"F. SOUES,
"*Gold Commissioner.*

"*To Hon. the Minister of Mines, Victoria.*"

YALE.

HOPE AND YALE DIVISION.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE, YALE,
"25th November, 1882.

"Sir,—I have the honour to forward herewith mining statistics for the Yale and Hope Divisions.

"The principal portion of the mining in this district has been carried on, on Saw Mill Flat opposite Yale.

"The Stahlo-Chuck Flume Mining Company brought water on to the flat at a very great expense to thoroughly prospect the ground, but, unfortunately, with no good results. The enterprise proved a complete failure.

"I might also mention that another company brought water on to the flat from Hills Bar Creek, a distance of about one mile and three-quarters, at a great outlay, with the same result as the Stahlo-Chuck Company.

"The miners after putting in considerable labour prospecting their claims, finally had to abandon them in consequence of the ground not yielding sufficient gold to remunerate them.

"There are still a few Chinamen (who have purchased claims from the whites) working on the flats, but with what result it is hard to find out.

"I have, &c.,

"W. DEWDNEY,
"*Government Agent, &c.*

"*The Hon. the Minister of Mines, Victoria.*"

KAMLOOPS DIVISION.

MR. TUNSTALL'S REPORT.

"KAMLOOPS, December 12th 1882.

"SIR,—I have the honour to enclose the mining statistics appertaining to the Kamloops District for the current year.

"The estimated yield of gold is $3,700, produced by companies permantly located on Tranquille Creek, and $300 more obtained by transient miners, making an aggregate amount of $4,000.

"I have, &c.,

"G. C. TUNSTALL,
"*Government Agent.*

"*Hon. the Minister of Mines, &c., Victoria.*"

OKANAGAN DIVISION.

No report has been received this year from the Government Agent, and it is feared that the prospecting mentioned in the last mining report as being vigorously prosecuted on Cherry Creek has resulted unsuccessfully.

KOOTENAY.

The report from this district is decidedly encouraging, and the statistics show a slight increase in the number of white miners, and also in the yield of gold.

The deflection of the Canadian Pacific Railway from the "Leather" to the more southerly "Kicking Horse" pass will surely tend to develope the resources of Kootenay and the Big Bend of the Columbia. This latter section offers great facilities for hydraulic mining, and will in all probability again become a mining camp, supporting a small but well-to-do community.

MR. FERNIE'S REPORT.

"KOOTENAY, October 31st, 1882.

"SIR,—I have the honour to forward herewith, the mining statistics for the Kootenay District, for the season of 1882. The hydraulic claims on Wild Horse Creek, on both sides of the creek, have paid better this year than they ever did before, and the miners are highly elated over their prospects for the future. On Perry Creek, the Black Hills Company has not made satisfactory progress, owing to the loose nature of the ground and quantities of water met with, which makes tunnelling very slow work. The Mont Cenis company are fixing up their tunnel, and expect soon to be taking out pay. The other gold mining companies in the different portions of the district have averaged fair pay for the work done. Good prospects were found on Bull River by the men building a bridge across the river. I afterwards fitted out a party to prospect higher up the river and try to trace the source of the gold. No paying

prospects were found above the long cañon, where the bridge is, and it is supposed the gold found came from a quartz ledge in the vicinity. * * * *

"I have, &c.

(Signed) "WILLIAM FERNIE,

"*Assistant Gold Commissioner.*

"*The Hon. the Minister of Mines.*"

COAL.

The Report of the Inspector is satisfactory and encouraging: the output for 1882 is the largest yet recorded, and good reasons are given for the confident expectation that the result of the labours of the present year will show a still further increase.

The East Wellington Company appear to be pushing forward their works with energy; and it may be predicted, with some safety, that in the next annual report of the Inspector, their Colliery will help, substantially, to swell the total of the returns.

The following table shows the output of each year from 1874 to 1882, inclusive:

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,009
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000

"NANAIMO, B. C.,

"20th February, 1883.

"SIR,—I have the honour, in pursuance of the 'Coal Mines Regulation Act, 1877,' to respectfully submit my annual report as Inspector of Mines.

"During the year ending 31st December, 1882, coal mining has been carried on by the Vancouver Coal Mining and Land Company, at Douglas Pit, Chase River and Southfield, and by Dunsmuir, Diggle, & Company, at North and South Wellington Collieries.

"The output of coal for 1882 at the above named collieries, amounts to 282,139 tons, being an increase of 54,139 tons above the product of 1881, and the highest yet attained in any year.

"The coal in stock on the 1st January, 1882, amounted to 9,318 tons; which quantity, together with 282,139 tons raised, made a total of 291,458 tons of coal for consumption and sale.

"In 1882, 232,411 tons of coal were shipped from this Province to San Francisco, and ports in California; Portland, Oregon; Seattle, Washington Territory (for gas making); ports in Alaska Territory; Mexican Ports; China; and the Hawaiian Islands; and to mail steamships and vessels calling.

"Sales of 56,161 tons have been made for home consumption by local steam vessels, manufactories, and for gas making, and household and other uses. The domestic sales for the year are 15,970 tons more than the sales of 1881.

"The stock of coal which was on hand at the Collieries at the end of the year 1882, amounted to 2,885 tons.

"It is proper that I should explain that although the general output of coal for 1882 has been kept up comparatively well, yet if the operations at Chase River Mine had not been so much hampered by troubles by flooding, and other mining casualties, which prevented the Vancouver Coal Company from producing their usual output from their mine, the aggregate output for the year would have still further exceeded any former returns. I believe, however, that the mining difficulties which have beset this company are being surmounted, and I antici-

pate that with the extension of the lower workings of Chase River Mine, and the continued development of the Southfield seam, the company will soon be able to realize their former output from these mines alone.

"With regard to the shipments of coal for 1882, about 158,000 tons were destined for San Francisco, being slightly less than the consignments of 1881.

"The total receipts for 1882 at San Francisco (our principal foreign market), as shown by the commercial returns of that port, amounted to about 883,000 tons, contributed as follows:—

	Tons.
Mount Diablo	113,255
Coos Bay	14,533
Seattle	154,611
Tacoma	54,627
British Columbia	157,762
Australia	158,901
Great Britain	188,771
Cumberland	14,860
Anthracite	24,996
Chili	580
Total	882,896

"It will be observed that British Columbia stands high in rank as a source of the coal supply of the important market of San Francisco, where our article holds a well-established reputation.

"One able commercial publication at that port recently remarks—'British Columbia has 'been supplying this market with coal for about a quarter of a century. The oldest claims of 'this character are at Nanaimo. For a dozen years or more Departure Bay has been gaining 'in prominence as a source of coal, and the Wellington Colliery sends along its regular quota 'monthly; its popularity as a domestic coal finds it a ready sale at top prices.'

"With such a record, and bearing in mind the fluctuating character of the supplies from Great Britain and Australia, this Province may reasonably reckon upon finding room in the San Francisco market for an expansion of its coal trade fully commensurate with the probable increase of production, and at fairly remunerative prices, for many years to come.

"For some time past a considerable portion of the exported coal has been shipped direct from this Province to Wilmington in Southern California, as railway lines and other consumers in that part of the State that formerly drew their supplies from San Francisco are now chiefly supplied at Wilmington.

"His Excellency the Marquis of Lorne, Governor-General of Canada, during his stay at Nanaimo, visited the collieries, and by personal investigation obtained a knowledge of our mineral resources and an insight into the mode of working and shipping our coal that appeared to impress him very favourably.

"In this connection, I trust it will be pardonable for me to refer to the comments of the London *Times* upon the remarks as to our coal industry made by His Excellency the Governor-General at the Victoria banquet.

"The *Times* says:—'The Colony (British Columbia) may be said to have owed its existence 'to the discovery of gold in 1856; and now that the supply of nuggets has ceased and the gold 'has to be sought for by the costly method of a regular siege, there is still wealth to be gained 'from the coal fields. The coal from the Nanaimo mines now leads the market at San Fran-'cisco, and there is no reason to doubt the Governor-General's forecast that before long 'Nanaimo will become one of the chief mining stations on the American continent.'

"The Canadian Tariff still presses upon our coal industry, and the inequitable impost of 75 cents per ton heavily handicaps our coal on its entry into the United States. It is not necessary, however, in this report to do more than mention these vexed questions, so that they may be kept in view, as the whole subject will be found fully treated upon in former reports, to which I beg leave to refer.

NANAIMO COLLIERY.

DOUGLAS PIT.

"At this mine there are only a few miners sending out coal at present, but that will not last long, as they are taking out pillars (of coal) which were left on the road to the working

faces further in, and which now that these inside places are worked out are no longer required.

CHASE RIVER MINE.

"The workings here are from a slope about 500 yards long. The coal is mined principally from what is known as the No. 4 level, but there are a few other places where they are taking out pillars. About 400 yards along the above level a slant branches off in a northerly direction, angling across the pitch of the coal, and is down about 400 yards at the bottom. It is under the sea at the head of Nanaimo harbour. The thickness of strata intervening between the salt water and the workings underground is about 500 feet, made up of shale, sandstone, and conglomerate rock. This is quite a sufficient cover for safety against the salt water. There is a little water that comes out of the coal and rock, but it is found to be quite free from salt. This is the slant mentioned in a previous report. At the bottom the coal is four feet thick, hard, and of good quality. This mine is wrought on the pillar and stall system, the coal varying in thickness from four to six feet, with a pitch varying from 10 to 45 degrees. Nearly all the way down this slant the coal is good and hard. The miners have not met with anything to hinder their progress, and at the face now it is almost flat. This drive continued on its present course would come close to the shaft which is being put down at the Esplanade in Nanaimo, about 1,000 yards distant. This mine is almost entirely free from fire-damp. The fireman on going into the places in the morning will occasionally see just enough to let him know that there is gas in the mine. This place is ventilated by a large furnace at the bottom of the upcast shaft. The air is conducted in on the separate split system. Ventilation is very good, and the air is conducted close into the face of the stalls, the pillars between being thin, so that whenever it is required there is a connection or place put through to the next stall, hence the return; so that after the air has gone around the working faces it returns by the furnace to the upcast shaft. The workings of this mine and the workings of Douglas pit are connected, and are all as one, which makes them very extensive. In the winter season the flow of water gets to be very heavy in this place. Being the lowest of all those workings, it drains to the pumps here; and this winter the present pumping machinery has not been large enough to keep the water out, so that there has been very little coal coming from the lower level for some time. Now they are erecting another large pump, which will be working two or three days from now, so that the mine will be kept dry without causing any delay to the working of it.

FITZWILLIAM MINE.

"There has been nothing doing at this mine in the way of taking out coal since the end of April last, but there is a likelihood of it being started again. This Company has been carrying on very extensive works in exploring and opening new mines. Amongst them is the shaft I mentioned in my previous report. It is now down to the depth of 450 feet, which leaves 150 feet to get to the coal. Owing to a strong inflow of water they had to stop work in the bottom about two months ago until they get a large engine erected, which is to be a double engine with two 30-inch cylinders, seven feet stroke. This engine is supposed to be able to do all the work in the way of taking out water, and all the hoisting that will be required at this place. About 75 yards to the north of No. 1 shaft they are putting down another shaft 16 feet in diameter, which is now down 120 feet, having gone through one vein of coal two feet thick, which is hard and good. At this shaft there is also a double engine with two cylinders, 16 inches diameter, four feet stroke. This engine has been worked in the No. 1 shaft for a short time. All this machinery, with boilers and appliances for the same, with pumps, gearing, rails, &c., came from England during the past year.

"There is also a new mine starting at Southfield. A tunnel has been put in 250 yards in the coal, but it is not so thick and regular as it is expected to be when further in. From the commencement it has varied in thickness from one to ten feet. Ahead of this tunnel there were a series of bore-holes put down some time ago, which proved that the coal they went through with those borings varied in thickness from six to twelve feet. It is to be hoped that at this place there will be a profitable and extensive mine. As the tramway is nearly all graded and about one-half of it laid with rails, and the other half is about ready for them, there will be no delay, when they once get into the coal, to get it to the wharf.

"In the Westfield, they put down a bore-hole, but did not succeed in finding the coal. Now, they are putting down another, which shows good indications of getting what is known here as the Wellington coal.

WELLINGTON COLLIERIES.

WELLINGTON MINE.

"This is the slope mentioned in a previous report. It is down about 1,000 yards. The coal mining here, as in all the other mines belonging to this Company, is wrought on the pillar and stall system, and is hauled out by a powerful double engine erected some distance from the entrance or mouth of the slope. This being the main travelling way into the mine, it is kept in good order and is quite safe. The roof is supported on timbers from 12 to 15 inches in diameter, which are always renewed from time to time as required, being put in in a substantial and workmanlike manner. The signal, or telegraph, runs the entire length of the slope, with a battery in the engine-house to which is attached a bell fixed near to the engine driver. This signal can be immediately utilized on any part of the slope. There are four levels worked from here, two to each side of the slope, known as 9 and 10, on one side, and 7 and 9 on the other. The coal in these places is from six to ten feet thick and is of well-known good quality. I inspected all these places frequently during the past year when the miners were at work, so that I could see them in their stalls and observe the condition of the mine while they were working, and also hear if there were any complaints. I have frequently enquired if they had anything to report to me about, which was not as they thought it should be, but there have not been any complaints made to me, either verbal or otherwise. I frequently tell them about the dangers of the roof, that they cannot be too careful in attending to the propping of it, and other dangers connected with mining, as they are exposed to them in every movement.

"The ventilation of this mine is obtained partly by a large furnace at the bottom of one of the upcast shafts, and partly by a large fan worked by a double engine erected at the top of another upcast shaft. The No. 2 shaft is also ventilated by means of this fan, being 30 feet diameter and 10 feet wide. Ventilation is good. There are three main divisions of air traveling here, which are conducted well into the workings by stoppings, and when near the face of the stall by brattices. When a sufficient distance has been cut by a connection put through to the adjoining stall, as you will have seen that the plan of working is pillar and stall, the air, after diluting the gases, goes away with the smoke to the furnace and fan shafts. In this mine there is now very little fire-damp met with. The fireman sometimes sees it when examining the works in the morning previous to his notifying the miners that the works are all clear or otherwise. They also examine the old works frequently before the pillars are taken out. It was in this mine where the foreman and other two men were slightly burnt. They were going upon a large pile of rock which had fallen out of the roof, the foreman being first, the other two following, none of them having a safety lamp. On the top some gas had collected, which kindled at their naked light. This is the only explosion of gas in this mine during the past year. The manager is very strict in seeing that the firemen attend to their duty, for on them great responsibility rests as to the safety of the mine for the workmen. One fireman cannot leave the mine till another one takes his place, so that the mine is never without one. I have been through all the working places, airways, and a great part of the old works, and I have not seen any gas in the mine during the past year, having a safety lamp with me sometimes but not always when making these inspections.

"There are six different ways out from this mine. Most of them are in order for use if required. I have always found a good stock of timber on hand and every other thing which would appear to be necessary for the safety of the workmen and the working of the mines.

No. 2 SHAFT (OR SOUTH WELLINGTON).

"I have examined this pit frequently during the year, but at the end of the month of October work was stopped in it, and there is not likely to be any coal taken out before spring. The works are in good order, standing ready to take out coal, which will be principally from the pillars. Up to the time of stopping the works were kept in good order; and I may here state that there has not been any accident of any kind in the pit, with the exception of a miner getting slightly burnt by injudiciously returning to a shot. This place is well ventilated, which is caused by the same fan mentioned as partly ventilating the Wellington mine. I have frequently found 300 cubic feet of air per minute for each man, and it has been almost entirely free from fire-damp.

No. 3 PIT, WELLINGTON COLLIERY.

"You will see by a previous report that they had got coal in this shaft, and were putting up machinery, head gear, &c., so as to be able to start to take out coal. Now the works are

in good order and they are getting out about 150 tons per day, but at present they cannot employ more than 20 men in it at any one time, as there is no connection or outlet, and the law restricts them to the above number. This will be got over, however, in a few days, as they are about to connect with the place known as the fan shaft, which will also be the means of ventilation. As they are limited to the above number of men, they are utilizing them to the best advantage by extensive opening out and proving their coal.

"There is a slope down about 500 yards, with good hard coal all the way varying in thickness from eight to eleven feet, which is being continued and proving to be a good and extensive mine. There is a double engine placed at the top of this slope made by Mr. Joseph Spratt of Victoria, which any engineer might be proud of. Ventilation here at present is obtained by a steam jet, which makes good air for the number of men employed. Between No. 2 mine and this one (No. 3) there is a large down throw, or fault, which makes this like opening up a new field. It gives off considerable gas, particularly in close places, such as levels and headings, which have to be carefully attended to, so that the air is brought close to the face by brattice or otherwise.

"You will observe that there were quite a number of persons slightly burnt here, and that negligence or oversight was principally the cause of these explosions. This, I trust, will prove a warning to all concerned not to go without a safety lamp where fire-damp has been seen or is suspected, but to examine and make sure that there is nothing of the kind before taking a naked light in. To all appearance, there is every probability of there being a large output of coal from this pit this year.

ADIT LEVEL.

"In the report of 1881 mention is made of an adit level entering from the valley of the Millstone river. This level was run in about 300 yards, where it connected with the Wellington mine, which is now all as one mine. At present there is quite a large output of coal per day from this place. The workings here are, as in the other mines, on the pillar and stall system, the coal being six feet thick and very hard. This level is of great value to the Company, as all the water from the mine above this level will run out here.

"Ventilation is caused by a large furnace built at the bottom of the upcast shaft. Air is good, although sometimes the brattice here, as in all the other mines, is generally further back than the Mining Law allows. The blasting is done with heavy charges of gunpowder, some times as much as two pounds in one charge, so that brattice nine feet off would be almost sure to be broken down, which would be labour lost as well as timber destroyed; but considering that there is little or no gas seen here it is not necessary to keep it so close.

NO. 4 SHAFT, WELLINGTON COLLIERY.

"This shaft, which was recently put down, is on the bluff overlooking the valley, It is 633 feet deep, with a bore-hole in the bottom 63 feet further, so that this is the deepest shaft about here, being about 700 yards east of No. 3 shaft, and about 250 yards in a north-easterly direction from the bottom of the slope in No. 3. In going down with this shaft, they went through several thin veins of coal, but, at the depth of 350 feet from the surface, they struck what is known as the Wellington seam of coal, which proves to be 10 feet thick, hard, and of its usual good quality. Though the drive is only in about 30 yards, yet it gives off a considerable amount of gas, the miners working only by the light of a safety lamp. But it is most likely that, like all the rest of the mines about here, as it gets opened out, the fire-damp will decrease. At present, they are working about the shaft, and on the top, getting everything in good working order, so that everything may be safe, as far as can be seen. That part of the shaft below the above-mentioned seam of coal, has been put down for the purpose of driving a tunnel through the fault, to connect with the workings of No. 3 shaft. This tunnel will be used for taking out coal, and also for the purpose of ventilation.

"A contract has been let for building a railway to this pit, being over a mile in length, to connect with what is known as the North Wellington railway. This company may be congratulated on their success in finding this coal, as well as the prospect of having a large output of coal during this year (1883).

EAST WELLINGTON COAL Co.

"This is a new work, with Gabriel Wingate, mining engineer, superintendent. This company having purchased what was known as the Westwood estate in Mountain district, situated in the valley of the Millstone river, and about half-way between Nanaimo and Wellington; and having obtained possession of this property in August last, immediately commenced operations by starting to sink a shaft 18 feet by 8, throwing out the gravel and rock to a depth of 30 feet, where they found the rock solid, and commenced to build up with timber, filling the space up between the timber and the wall with clay, and continued this to the surface, so that they have the satisfaction of knowing that the surface-water is shut out from the shaft. A steam-engine has been put up as a temporary one, to hoist the rock out, and what water may be met with, which, so far, is very little. They have gone through three thin seams of hard coal, one of them 2 feet thick. Now the shaft is down about 200 feet, and they have the prospect of getting, very soon, what is known as the Wellington coal. The line of railway is also located and surveyed to Departure Bay, a distance of 3½ miles. It is of easy grade, and will not be difficult to get ready for the rails, a good part of which is already on the ground. There is also another large hoisting engine ready to start, in addition to that mentioned above. This is a double engine, having 14-inch cylinders with three feet stroke, and two large tubular boilers generate steam. With this engine and boilers, there are also pumps, gearing, pulleys, and other appliances necessary to put it in good running order. This machinery will be able to hoist a large quantity of coal per day, at the depth this shaft will be.

"In addition to the above works, this company is building a large sawmill, with steam-engine and boiler attached to the same. This mill is also being erected in the valley, near to the shaft, with a lot of good timber close at hand, so that in a short time it will be cut into lumber.

"There has been some prospecting done at Comox, by Mr. T. D. Jones, of Nanaimo, during the past year. He has got a boring machine wrought by a steam-engine, and has put down a bore-hole in the valley to the depth of 675 feet. The coal has not been reached, although the prospects for it are good; but it may be very deep in that locality. He is now working in another place, and it is to be hoped he will be successful in finding such a seam of coal as will be a reward for his labour and outlay, and a boon for the district and country at large.

"From the energy and enterprise of these different coal companies in carying on their works and opening out new coal mines, thus investing a large amount of capital, we may expect a large increase of the output of coal during the year we are now commencing. All these new works will doubtless soon add very largely to the output of coal of this district, and cause such an influx of workmen as will give a fresh impetus to trade and contribute in no small degree to the general welfare and prosperity of the Province.

ACCIDENTS IN AND ABOUT NANAIMO AND WELLINGTON COLLIERIES FOR THE YEAR 1882.

"4th January—Henry Maguire, miner, got his ankle broken by a piece of rock falling on him when going to work in Chase River Mine.

"10th February—John McLean, fireman and track layer in No. 3 shaft, Wellington Colliery, was seriously injured about the back by a piece of coal falling on him from the roof while at work.

"20th February—A Chinaman, working with George Old, miner, was killed by a piece of rock falling on him from the roof, when taking out pillars (coal) in Chase River Mine.

"3rd March—George Reay, miner, was seriously injured by rock falling on him when at work taking out pillars in the Wellington Mine. He had been frequently told by the foreman to be careful. The above George Reay died on 8th March.

"17th March—William Gilbert, miner, was slightly burnt about the face and hands by an explosion of gas, when at work in his stall in Chase River Mine.

"31st May—John Andrews, mule driver, had his leg broken by a fall of rock from the roof, when at work in the Wellington Mine.

"3rd June—Ah Cay, Lin Sin, and Say Loy, Chinamen, were burnt by an explosion of gas in No. 3 shaft, Wellington Colliery. They went into a place which was fenced off. The fireman having examined it in the morning, there was no gas; four hours later the foreman was in the same place and found all clear; later the Chinamen went in, not having anything to do there, hence the explosion as above.

"24th June—A Chinaman working with William Brinn, miner, was killed by a piece of rock falling on him when taking out pillars in Chase River Mine. In this place the coal was 18 feet thick.

"1st July—George Cracey, miner, was burnt about the hands and arms by an explosion of gas in No. 3 shaft, Wellington Colliery. He had been out of his stall for sometime, and returned carrying his lamp on his head; a little gas having collected near the roof, hence the explosion.

"10th July—James Frame, miner, was slightly injured in No. 2 shaft, Wellington Colliery, by injudiciously returning to a shot, thinking it had gone out, but when near to the face the blast went off, having burned longer than he expected.

"17th July—William Montgomery and William Biggs, sinkers, were burnt by an explosion of gas in No. 4 sinking shaft, Wellington Colliery. This is the first gas that has been seen in this shaft, although they examined it frequently with a safety lamp.

"18th July—George Churchill, track layer in Chase River Mine, met with a serious injury by being jammed on a platform by the descending carriage on a self-acting incline.

"1st August—William Noye, miner, was injured in the Wellington mine, by a piece of rock falling on him when at work in his stall.

"8th August—Henry Adams was killed, and William Craven and John Robinson were severely burnt by an explosion of gas in No. 4 sinking shaft, Wellington Colliery.

"11th August—Ah Hoe, Chinaman, had his back dislocated by coming in contact with the roof, when sitting on a loaded car which was being hauled by an engine up an incline, in the Chase River Mine, being an infringement of the Mining Act, and which the workman is strictly charged not to do. The above Chinaman died on 26th August.

"27th September—Michael Wilkinson, miner, was slightly burned about the face by an explosion of gas in his stall, in the Wellington Mine. He went home to dinner, and while away a little gas had collected in his place; when he returned he kindled it with his naked light.

"20th November—Thomas Browne, miner, was seriously bruised about the body, being caught by the ascending cars when crossing the slope in the No. 3 Wellington Pit, after being told the cars were near at hand.

"27th November—A Chinaman was slightly hurt in the Chase River Mine, by a piece of coal which came down a shute and struck him on the leg.

5th December—David McKinlay, miner, in Wellington Mine, was seriously injured about the head and shoulders, being struck by a piece of coal thrown from a shot fired by another man, without letting McKinlay know he was going to blast, although aware that the two places were about connected.

"6th December—Louis Corteu, miner, was slightly bruised about the shoulders while at work in Wellington Mine.

"12th December—Robert Scott, overman, John Richards, and Allan Stevenson, miners, were slightly burnt about the hands and arms by an explosion of gas in the Wellington mine. Stevenson was taking out pillars and had got through to where the roof had caved to a considerable height; Scott had got on the top of the cave, followed by Richards and Stevenson, all three having naked lights. They had not tested with the safety lamp to see if there was any gas. The gas had collected there, and they kindled it with their light. Hence the burning. The fireman could not find any gas about the cave when going his rounds, and he could not get on the cave until such time as an opening was made.

"20th December—John Saunders, miner in No. 3 pit, Wellington Colliery, was cut about the face and arms by the premature firing of a shot. The cause is thought to have been a defective squib.

"In making out my report for the year that has closed, I am sorry to have to return a list of so many accidents, both fatal and serious—viz., 29 in all.

"Nine of these were by falls from the roof; 13 by explosions of gas; 3 by shots; 3 by the cars; and 1 by falling timber from the effects of an explosion of gas in a shaft. You will perceive that five of these were fatal; three of them were at the face where the miners were working taking out pillars; and one by riding on the top of loaded cars hauled on an inclined

plane by a steam engine. The other was in a sinking shaft; and by reading the evidence take.. at the inquest on the body you will have the full particulars.

"With the exception of one, all those by explosions of gas were in the Wellington Colliery, which is well ventilated. There have not been any complaints made to me about the air during the past year, and I have not seen any gas in the mine in all that time. I always found a good current of air passing through the mine, and about double the quantity per man of what is mentioned in the Mining Act. In No. 3 pit there are places which sometimes give off a considerable amount of gas. There are places sometimes in the stalls which give off a little gas where the air does not strike as it should do, although the brattice is close up, and if there is any gas it will collect in those places. The accidents reported of Wm. Montgomery and Wm. Biggs being burnt by an explosion of gas in No. 4 sinking shaft may be thus explained. I was there shortly after the explosion. Montgomery told me there were two safety lamps at the shaft. They went down and examined it, but there was no gas to be found, but to make it more sure they sent down a naked light on the bucket by itself. It went to the bottom, and was brought up again to the top, burning all the time. Then the men above-mentioned got into the bucket to go down, and, as near as they could judge, when about 60 feet from the bottom or nearly 300 feet from the surface, there was an explosion which burnt them about the face, arms, and hands. The explosion was on the downcast side. They could not account for it, as they thought they had used every precaution against danger. Ventilation was good, and they said they never had any cause to complain about the air. The drilling was done by a machine worked by steam which exhausted on the upcast side, and the brattice was down well towards the bottom. In looking over the list of accidents caused by explosions of gas, you will see that with the exception of the one above mentioned, all these explosions were caused by want of proper care on the part of the workmen. None of these accidents happened at the start of the shift, but when the men having been out of their stall for some time returned to them without having them examined to see whether there was any gas or not. Then we have those Chinamen going into a place which was fenced off, where no one was allowed to go without a safety lamp. You will also observe that there have been eight accidents by falls from the roof. Two of them took place on the travelling road; all the others were at the face of the workings, which are under the control of the miners themselves. So it would seem that the number of accidents in and about mines can only be lessened by greater care and more intelligence on the part of the miners, and also of strictness on the part of the manager. But, as long as there are mines, there always will be some accidents which no human care or foresight can prevent. You will also see in looking over this report, that there have been a great many of the casualties mentioned in it of a preventible character, and which would be unjust to charge upon the proprietors or managers of the mines, when they have provided every appliance necessary for safety, but are traceable either to the carelessness or recklessness of the workman. I hope that during the year we have entered on every one will use the greatest care (as a mine which gives off gas having one reckless person in it might cause a sad calamity to all those around him), so that when it comes to a close there will be few, if any, accidents to record.

"The following statement shows the quantity of coal raised and the number of fatal and non-fatal accidents during the past five years:—

Year.	Tons raised.	Fatal Accidents.	Non-fatal Accidents	Tons raised per life lost.
1878	170,496	3	7	56,832
1879	241,301	12	18	20,108
1880	267,595	3	13	89,198
1881	228,357	1	11	228,357
1882	282,139	5	24	56,428

"Appended hereto are the Annual Colliery Returns.

"I have, &c., ARCHIBALD DICK,
"*Government Inspector of Mines, Nanaimo.*

"*To the Hon. the Minister of Mines.*"

NANAIMO COLLIERIES.

Output of Coal for 12 months ending December 31st, 1882.	No. of Tons sold for home consumption.	No. of Tons sold for Exportation.	No. of Tons on hand 1st January, 1882.	No. of Tons unsold, including coal in stock, Jan. 1st, 1883.
51,429 5 20	14,032 10-20	43,842 10-20	6,887 17-20	442 2-20

Number of hands employed.			Wages per day.		
Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
187	68	18	$2 to $4	$1 to $1 50	$1 25 to $2 50

Total hands employed ..... 273 | Miners' earnings, per day ..... $2 50 to $5

Name of Seams or Pits.—Chase River, Douglas, and Southfield.

Value of Plant.—$140,000.

Descriptions of Seams, tunnels, levels, shafts, &c., and number of same.—Chase River, worked by slope; 4½ feet to 16 feet thick; 5 levels, 6th starting; Douglas Pit nearly exhausted; Southfield adit driven 240 yards (about:) seam of coal variable and somewhat faulty; two shafts sinking—one down 440 feet, the other 120 feet.

Description and length of Tramway, Plant, &c.—Railway, 2½ miles; locomotives, 3; several powerful winding engines, steam pumps, and 100 coal cars, averaging 5 tons each.

M. BATE.

WELLINGTON COLLIERY.

Output of Coal for 12 months ending December 31st, 1882.	No. of Tons sold for home consumption.	No. of Tons sold for Exportation.	No. of Tons on hand 1st January, 1882.	No. of Tons unsold including coal in stock January 1st, 1883.
230,710 11-20	42,129 5-20	188,569	2,430 16-20	2,443 2-20

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
None.	316	285	None.	$2 to $3 75	$1 to $1 25	None.

Total hands employed ..... 601 | Miners' earnings per day ..... $3 to $4 00

Name of Seams or Pits.—Wellington.

Value of Plant.—$245,000.

Descriptions of Seams, Tunnels, Levels, Shafts, &c., and number of same.—6 to 10 feet thick; 2 shafts working, 1 not working; 1 slope working; 1 adit level working; 2 air shafts; 1 of these large furnace at bottom, the other a ventilating fan, 30 feet diameter, driven by a pair of engines.

Description and length of Tramway, Plant, &c.—10 miles of railway; 5 locomotives; 150 wagons; 5 stationary engines working; 2 engines not used at present; 4 steam pumps; 5 wharves for loading vessels, with bunkers, &c.

Pro DUNSMUIR, DIGGLE & CO.,
CHRISTOPHER LOAT.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

TENTH ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1883.

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1883.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
			$ 47,935,963		

REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR 1883.

To His Honour CLEMENT FRANCIS CORNWALL, *Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

I have the honour herewith to respectfully submit the Tenth Annual Report of the Mining Industries of the Province.

I have the honour to be,

Sir,

Your obedient servant,

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,
23rd February, 1884.

REPORT.

GOLD.

The value of the gold exported by the Banks, during the year 1883, is as follows:—

Bank of British Columbia	$226,935
Bank of British North America	124,797
Garesche, Green, & Co.	310,145
	$661,877

The Table shows an increase in the number of miners employed. This increase is entirely composed of Chinese; and to this fact may be attributed the decrease in the average yearly earnings per man.

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, 30th November, 1883.

"*To the Honourable the Minister of Mines,*
"*Victoria.*

"SIR,—I have the honour to submit, for your information, my annual report on the gold mines of this district for 1883, accompanied by statistics in tabular forms, from which it will be seen that there has been a small decrease in the gold product of the district from that of 1882, which may be accounted for by an unusually dry season, many companies being obliged to suspend work in July, from a lack of water. Had it not been for this, there would undoubtedly have been a larger yield than that of the previous year.

"Quite a number, attracted by the rare opportunities presented for investments, or the making of permanent homes along the line of railway, now in course of construction in the Province, continue to leave the mines; consequently, our present white population is less than at any time since the first gold discoveries in the district.

"On Williams and Lightning Creeks, where the water supply in the most favourable seasons is limited, and where the larger portion of the claims are now worked by hydraulics, the drought has greatly retarded operations. Indeed, it is doubtful whether any of the claims on these creeks have yielded more than a fair return for the labour expended upon them, if I except the old Barker Co., on Williams Creek, which produced some $12,000 for a little over two months' work. This company will continue work during the winter, and I am told promises well for its owners.

The Chinese companies working the bars and benches of lower Antler Creek have done exceedingly well the present year. They have, I understand, in some instances, constructed wing-dams, by which means the bed of the creek is worked and found to pay. This is a new feature here, which will add much to the prestige of this creek. The bed-rock has not as yet, however, been reached in any instance—an undertaking regarded by many with favour.

"On the upper part of Antler Creek, the Nason Co. hold a 'real estate' claim, which has not been worked for some years, but upon which active operations have again commenced. The company, having purchased the saw-mill, iron pumps, and machinery of the Victoria Co., Cunningham Creek, would appear to have a proper appreciation of the difficulties to be encountered in testing their deep ground. Much interest is manifested in the success of this company.

"The Mary Ann Co., a hill claim adjoining the Nason, are reported to have found a channel and obtained most encouraging prospects, but up to the present time it is not sufficiently developed to prove the value of the discovery. The Yellow Lion Co., adjoining the Mary Ann, which was taking out good pay in the early part of the season, were completely burned out in July, from the woods taking fire. Cabins, shaft-houses, and even the timbers in the shafts, were completely consumed, entailing a heavy loss on the company, who have since been engaged in replacing losses.

"On Grouse Creek, little has been done in the bed of the creek. Several companies have been engaged opening up the side hills preparatory to working the same by hydraulics. Their prospects are very encouraging. Cunningham Creek, worked principally by Chinese, has turned out fairly.

"It is generally regretted that the Government found it impossible to accede to the wishes of the applicants for a lease of mining ground on Slough Creek, as the names of the parties interested in the undertaking were considered a guarantee that the deep ground on this creek would have been thoroughly proven. It is, however, anticipated that, upon the meeting of the Legislature, the present Act relating to mining leases will be amended, by conferring greater powers in such matters upon the Executive.

"The benches along Slough Creek have paid well to the Chinese who work them.

"The companies prospecting on Dragon and New Creeks for the past three years have not as yet succeeded in getting on pay.

"The report from Quesnellemouth Polling Division shows that about the same amount of gold was produced from the bars and benches of Fraser, Quesnelle, and Cottonwood Rivers as in 1882.

"The Horsefly River section promises to again claim attention. Chinamen working here, in bottoming a new shaft recently, are reported to have struck gravel which will pay from three to four ounces to the set of timbers.

"The parties fitted out last fall by the farmers, merchants, and others in the district (referred to in my last report), to follow up discoveries supposed to have been made during the summer, to the northward of Cottonwood Bridge, and on Porter's Creek, some forty miles to the southward of Barkerville, were not in either case successful in developing anything worthy of mention.

"There has been gold dust to the amount of $213,420.50 melted at the Assay Office, Barkerville, for the eleven months of the present year, showing an increase of $19,278.25 over that melted for the same period of 1882.

"The gold product of the mines in this district for the year, exclusive of Omineca, as nearly as can be ascertained, is as follows:—

Barkerville Polling Division, 11 months	$177,177 00
Lightning Creek " "	71,200 00
Quesnelle " "	70,160 00
Keithley " "	99,250 00
Estimated amount of which no account was obtainable	20,000 00
Estimated yield from date to 31st December, 1883	20,000 00
	$457,787 00

"EXPLORATIONS.

"The sum placed at my disposal to assist prospectors in their outfits to explore and prospect for new mines, has been expended, I believe, as judiciously as circumstances would permit, but, apparently, so far as the discovery of placer mines is concerned, without important results.

"I am, however, much impressed with the value and importance of the discoveries made by some of the parties, of quartz veins.

"Nine different parties, of from two to five men each, have been assisted in their outfits by the Government exploration fund, six of whom, up to the present time, have sent in reports, copies of which I herewith enclose.

"Mr. McKinnon and party, who explored in the Nation River and Omineca part of the district, found nothing worthy of enlisting attention.

"Mr. Leclare, who prospected in the neighbourhood of South Fork Lake, has sent in a map or sketch of the country traversed by him, but, up to the present time, has failed to send in his report.

"Messrs. Stewart & Wilson, as also Messrs. McGuire & Ross, prospecting in the country to the north-east of Bear Lake, and down Bear River, report the finding of creeks which will pay three dollars per day, but, owing to the difficulty and expense of taking in supplies, these discoveries are not of moment at the present time.

"Messrs. Synon & Fleming report finding extensive bench diggings on Cottonwood River, some ten miles below the bridge, on a higher level than any ground hitherto worked on that stream. Since this discovery, two companies have located claims, and will bring in ditches during the winter.

"Messrs. Pearce, Schuyler, & Shepherd, going some sixty miles down Willow River, found nothing worthy of note in placer mining, but are much impressed with the value of the quartz ledge discovered by Messrs. Foster & Paris, about a year ago (referred to in my report for 1882).

"Messrs. Porter, Johns, Wilson, Swan, & Tillie, prospecting and exploring to the south of Barkerville, were equally unsuccessful as regards the finding of gravel mines, but their discovery of gold in the Mammoth Quartz Ledge, reported last year by Petrie, Porter, & Co, I regard as of paramount importance. Upon the return of this party, a company was organized, and three men sent out with blasting powder, tools, &c., to make a more thorough examination of the ledge, but, from the inclemency of the weather, were able to do but little work. Mr. Schuyler's report to the company, kindly furnished me by the secretary of the company (a copy of which I enclose), will be read with interest. This company purpose starting work as soon as a crust is formed on the snow sufficiently strong to admit of hauling light hand-sleighs with loads over it—probably in March. Four locations have been made on the lode, of 1,500 feet each.

"The Burns' Mountain Quartz Mining Co. are prosecuting work on their tunnel with vigour. The tunnel, when completed, will be some 600 or 700 feet in length, the work being under contract, with three shifts working. The rock through which the tunnel is being run is found, so far, exceedingly hard to blast. Contractor is making from 10 to 15 feet a week, and the tunnel is now in about 250 feet. I have, &c.,

(Signed) "JNO. BOWRON,
"*Gold Commissioner.*"

REPORT OF MESSRS. STEWART & WILSON.

"*To John Bowron, Esq., Gold Commissioner.*

"SIR,—In accordance with your request, we hereby report as follows:—

"We left Bear Lake August 10th, going by boat down Bear River, about 25 or 30 miles. The river being very low, we made slow progress. It was after sunset when we camped for the night. Rain fell in the afternoon and all night.

"On the 11th we *cached* surplus provisions at the mouth of a creek, on which we found a little gold. We resolved to prospect it more thoroughly on our return trip.

"The next day (12th) we left the river, travelling west about four miles, in a valley which varies from a half to about one mile wide. It then runs west north-west. Travelled six miles in that direction, and found a creek flowing into the valley from N. to S.

"13th—Went up this creek and prospected. Found a little gold about one and a half miles from its mouth; gold light and scaly. We then determined to go farther into the mountains.

"14th—Travelled north-west, over a high mountain. A severe thunder storm prevailing, we were forced to camp on the summit that night.

"15th—Rain, accompanied by a dense fog, so thick that it was difficult to travel. Only made about four miles, in a westerly direction, and camped.

"16th—The fog and rain continued so thick that it was very difficult to keep our course; travelled about eight miles, gaining the north-west end of the mountain. Here we found a creek flowing from the south-west, which we followed down a distance of about four miles, when we camped for the night.

"17th—Sunk two holes on the creek, finding a little flour gold; bed-rock a blue whinstone. This creek falls into another stream which heads in the same mountain, and runs from south to north. We followed the latter stream on the 18th, about one mile down. Another stream comes into it from south-east, the united waters making a very large creek. Sunk one hole below the junction of the two streams; found no gold. Went on down, prospecting on all the shallow rock we saw for a distance of about three miles, where we put down another hole, without finding gold. Followed the stream down about two miles, prospecting as we went. Here we camped for the night.

"19th—Sunk another hole, finding the same barren sort of rock. We concluded it was not a paying stream that we were on. We then proceeded on to the mouth. The creek is about twelve miles long; it empties into a large valley which stretches E. and W., the water flowing into Willow River.

"20th—Travelled east about five miles, where a creek flows into the valley from the north, and empties to Bear River. The valley here is so flat that we could not tell when we crossed the divide. Went up the creek some distance and prospected, finding no gold, and camped.

"21st—Followed the valley, east, four miles, to another stream coming in from the north-east. Sunk some holes, and panned where we could find bed-rock. Spent all the 22nd prospecting, without success.

"23rd—Going east two miles, found another creek running north, which we went up, prospecting on the way. Found a little flour gold in a cañon, about three miles from its mouth, but, meeting with the same barren rock, we spent very little time on it. We returned to its mouth and camped.

"24th—Followed the valley, east, seven miles, trying the north side as we went, but without success. We spent two days here (24th and 25th), when we arrived at Bear River, where the water of the valley goes over falls of about sixty feet into the river, and flows over shallow rock. Here we could get small prospects which would pay two to three dollars a day. Our provisions being nearly exhausted, we were compelled to turn our steps toward the *cache*, which we did on the 27th. Following up the left bank of the river, after travelling about twelve miles, we reached a small stream or creek, where we found gold, but not in paying quantities.

"28th—Continuing up the stream, keeping about five miles back from the river, found a creek on which we got a little fine gold. This creek is about seven miles distant from the last mentioned creek, or about nineteen miles from where we struck Bear River, and six from the *cache*.

"On the 29th, arrived at the *cache*, up river about twenty-five miles. On the 30th and two following days, we sunk and ground-sluiced on a creek which empties into Bear River, near the *cache*. The bed-rock is about eight feet deep. On it we got a little coarser gold, one piece weighing six cents. Where we ground-sluiced there was three to four feet of gravel, containing fine gold that would pay from three to four dollars per day.

"September 2nd, went up the river and arrived at Bear Lake on the evening of the 3rd of that month. This closed the trip.

"Respectfully yours,
(Signed) "WILLIAM STEWART,
" "N. WILSON."

REPORT OF MESSRS. MCGUIRE & ROSS.

"*To John Bowron, Esq., Gold Commissioner.*

"We have the honour of submitting to you the following account of our prospecting expedition:—

"We left Barkerville on the 5th day of September, with two horses packed, and arrived at Bear Lake the same day—distance 22 miles.

"We sent the Indian back from there with the horses, and made that point our base for supplies. We met Mr. Wm. Stewart at Bear Lake, and, joining company with him, we three started on the 7th, with 60 or 70 pounds each, in an easterly direction. In about eight miles, we came to a lake, known as Indian Point Lake; camped and built a small raft, one navigating it, with the supplies on board, to head of lake, the other two following Mahood's survey trail on foot. From head of Indian Point Lake, crossed a low tract of land covered with small timber, for a distance of about two miles, to lake known as Big Lake. Constructed a raft

large enough to carry us all, and on the 9th passed up the lake ten miles, to what is called the Big Bend, and landed at mouth of a stream flowing south-westerly. It is a large stream, probably 3,000 miner's inches. The lake itself follows around more to the south, heading close to Swamp River. On the 10th, we started up the creek, through a pass 500 or 600 feet wide, in places; in others narrowing to 100 feet, and made about eight miles that day. Mahood's trail follows the pass for three miles, thence takes the mountain, bearing northerly. We left the trail at that point and took the bush, keeping in pass and bearing more to the eastward. In the morning, we found that we were in a slate range, and prospected as we went along, but found no gold. On second night from Bear Lake, we camped at the mouth of a creek coming more from the south than the one we were following, but could find nothing favourable. On 13th, after travelling about four miles, the pass opened out into an extensive meadow, one mile in width and three miles in length, with fine, tall grass and pea-vine, interspersed here and there with small patches of timber, and containing innumerable trails made by bear and cariboo. We passed over a low, scarcely perceptible divide, and, about two miles from summit, came to a large stream flowing north-easterly. Followed down two or three miles and camped. Continued down stream next day, about 10 miles, travelling being very bad; bed-rock of slate cropping out every two or three hundred yards. Prospected at various points, but found no indication of gold. Next day, about 8 or 10 miles further down, came to another large stream coming from the south-west. Made a camp at the creek, leaving one there, the other two taking three days' provisions, following the tributary up, prospecting the small streams coming into it, but finding nothing. One tributary, on north-east side, comes in about three miles above the mouth. We followed it up four miles. It contains about 200 inches of water. We found bed-rock in one or two places. The gravel looked well, but we could get no gold. Another stream, coming from the west and flowing nearly due north, we followed up about three miles to glaciers. It contains about 150 inches of water. The hills, or mountains, on either side are very steep, cut up every three or four hundred yards by heavy slides, leaving the sides stripped of timber from summit to base, many of them two or three hundred feet in width. We found a light blue slum, or wet clay, on this creek, but found bed-rock only in one place, namely, about one mile above the mouth, on east side. If there is any gold the channel is on the east side and covered deep by slides.

"We returned to camp on the third day, and made preparations to return to Bear Lake for supplies. We made the return trip in a little over three days, from which I estimate the distance travelled from Bear Lake to confluence of streams, at which we left one of the party, to be about 60 miles.

"We have been told by Wilson, the trapper, that, had we continued down the stream following north-easterly, we would have reached Fraser River in 15 miles, and would have struck a section of country much more favourable looking for gold. The country through which we travelled does not look look like gold-bearing, being composed of high bald mountain peaks and low marshy valleys.

"On the 22nd September John Ross and Alex. McGuire started down Bear River, following down on the east side. Camped the first day about 8 miles below Bear Lake; next morning forded the river to west side; water being knee deep; half a mile below crossing came to a creek emptying into Bear River, on west side; creek flows nearly due north; for half or three-quarters of a mile the stream flows through a wide flat, with benches eight or ten feet high on east side. The benches extend back from one to three hundred feet, and are composed of fine looking gravel. Found fine gold in every pan we tried, but could not get bed-rock. Less than a mile from the mouth, the creek becomes more confined, the hills rising to a height of 200 feet; the creek having low bars of fifty or sixty feet in width. Here we camped and sunk a hole 6 feet deep, with gold in every strata from top to bottom; gold fine, with an average of 1½ cents to the pan. There are a great many rocks, seemingly iron and quartz. The water drove us out, but the prospect improved as we went down. About 300 yards above are falls 60 feet high, and 200 yards above that another fall of 50 feet. From there the creek flows through a fine rolling country, lightly timbered. We followed the creek up about six miles and found fine gold everywhere we tried, but could not get bed-rock. The stream has a good grade, and I do not think it is more than twelve or fifteen feet deep, and I believe it would pay wages. There is one drawback, there is no timber nearer than five miles large enough for sluices, but one could raft timber down Bear River to the mouth of the creek and pack the lumber up. After spending four days on the creek we returned to Bear Lake, and thence, after resting two days, our provisions being exhausted, we returned to Barkerville,

"Accompanying the above we give you a rough sketch of the country travelled over.
"Wishing the report was more favourable,

"Yours respectfully,
(Signed) "ALEX. MCGUIRE,
"JOHN ROSS."

REPORT OF MESSRS. FLEMING & SYNON.

"CARIBOO, B. C., October, 1883.

"*To Mr. John Bowron, Government Agent,*
"*Richfield, Cariboo, B. C.*

"DEAR SIR,—When on our prospecting tour between Cottonwood House and the Fraser River, we discovered three benches about a mile in length and half a mile in breadth on the north bank of the Cottonwood River, and about ten miles from Cottonwood House, that we think will pay to work if a good supply of water can be got.

"And on the south side, and opposite, and for some distance below the benches referred to above, there are benches and flats that we think would pay wages if plenty of water can be got on to them.

"We are of the opinion that a sufficient amount of water can be taken from lakes on the south side of Cottonwood River, and be conveyed in ditch and flume to the lower end of ten mile cañon, thence across the river in a flume and on to the benches. We have applied for 500 inches of water from two lakes on south side of river, and about two or three miles from the ground we have located.

"We spent some time in searching for the lost Wallace quartz lead, but did not succeed in finding it, or anything that we could suppose to be traces of it.

"There is some quartz crossing the lower end of ten-mile cañon, but we did not consider it worth having assayed. There is some soft granite cropping out on the south bank of the cañon, a few yards below where the quartz crosses the cañon.

"Herewith find map of country herein referred to.

(Signed) "JOHN T. FLEMING,
"for FLEMING & SYNON."

REPORT OF MESSRS. SCHUYLER, PEARCE, AND SHEPHERD.

"BARKERVILLE, B. C., 25th October, 1883.

"*To the Gold Commissioner, Richfield.*

"SIR,—In accordance with instructions received from you at the time we obtained a portion of the Government grant in aid of explorations, we herewith present you a report of our explorations.

"We left Barkerville on the 4th September. On account of the difficulty experienced in getting pack animals, we had to hire Messrs. Fletcher & McNaughten's conveyance to haul our outfit to Beaver Pass; there we hired a horse from Brunskill, and, with one we took with us from Barkerville, started for Willow River, via Rushon Creek and Cañon Creek. We reached a point on Willow River, as far as we could get with horses, on the 7th, and sent the animals back with Naysmith, who had gone with us from Rushon Creek for that purpose.

"On the 8th, after *caching* a portion of our outfit, we crossed over Willow River to the east side of it, a short distance above the junction of Valley Creek with Willow River, and continuing down stream we camped at night on a small stream, which we subsequently named Beaver Creek. The following day we prospected this stream as far as its head, but could not raise any colour. The next day we found a large quartz ledge, supposed to be the one discovered by Foster and Paris last season.

"We spent several days prospecting this ledge, made a location, and took away with us samples to have assayed at Barkerville. The ledge is over five feet thick, crops out along the surface for about 600 feet, and dips at an angle of 45°, or thereabouts. Its direction, without making allowance for variation of compass, is 65° east of north, and 65° west of south. The country rock is of slate and the ledge cuts through it at nearly right angles. About one-fourth of the vein is largely impregnated with argentiferous galena ore, assays from which gave $19.98 silver, and traces of gold, and the quartz rock a small amount of gold per ton. The vein crops out on the side of the mountain in such a way that it will be very easy to prospect, and a small

amount of capital judiciously expended would soon determine its value. We expect to have capital at command by early spring to test its merits, and feel sanguine of its justifying our expectations.

"On the 12th, we continued down stream, 7 or 8 miles, as far as Canoe Creek. Could not get any prospects as far as we went in this direction, and on the 13th returned to our *cache* on Willow River, for supplies.

"On the 14th, we started down the west side of Willow River, and camped at night on a large creek, which we call Pick and Shovel Creek.

"The following day, prospected a tributary of this creek, but, under the most favourable circumstances, could only raise a few fine colours. On this tributary, we found an old prospect camp, containing the tools of some early pioneer. They consisted of an axe, shovel, fry-pan, gold-pan, small billy, cup, and spoon, and remains of a blanket. The axe had been stuck in a tree, and was so firmly grown around by the growth of the tree, during the 18 or 20 years that it had been there, that we could scarcely pull it out. These things had been left so securely sheltered as to have remained in a good state of preservation.

"The following and two subsequent days we spent prospecting the main stream, but with the same result as on the tributary. Here, also, we found an old camp, containing a shovel and two picks. Up this creek are a succession of small cañons, where the bed-rock is either exposed or so nearly so that six feet square could be stripped in an hour; yet, notwithstanding that the conditions were all of the most favourable kind, we could only raise a few fine colours, and that not continuously. Had another day and night of heavy rain while here, which raised the creek to such dimensions as to make it dangerous to ford.

"From 18th to 23rd, went down as far as opening which drains Hyde's Lake and that section of country prospected by Hilton and party, last winter. Failing to find anything like a prospect on any stream that would justify our exertions, we concluded, as we were about out of provisions, to return to the *cache*, which we reached the following day.

"25th—We returned to Cañon Creek. This is a large creek, running nearly due east, and upon which, a number of years ago, there was a good deal of money spent. We spent a portion of two days here, and came to the conclusion that the creek was entirely too heavy for us; that the work done upon this creek failed to test the deep ground which certainly lies upon the opposite side from where the work was done; and that, if a company was organized to test the deep ground, they would strike paying diggings, if not immensely rich ones. The following day, we reached Barry Creek, now in the possession of a few Chinese, and the next day Rushon Creek. Reached Barkerville, on the return, on the 29th.

"Unless the quartz ledge turns out something, our trip has been fruitless of any good results, except to determine that any prospecting done in the direction taken by us must be made on a larger scale, say composed of 6 or 8 men, with supplies and tools to test the deep ground. The travelling on either side of Willow is just about as execrable as it can be imagined, and, unless one is prepared to undergo a large amount of hardship, had better not undertake the trip.

"With many thanks for the Government aid given to us,

"We remain, &c.,

(Signed) "W. B. SCHUYLER,
" "SAMUEL PEARCE,
" "G. L. SHEPHERD."

REPORT OF MESSRS. PORTER, JOHNS, WILSON, TILLIE, AND SWAN.

BARKERVILLE, B. C., 17th October, 1883.

"*To the Gold Commissioner, Richfield, B. C.*

"SIR,—Having received a portion of the Government grant in aid of explorations, we herewith present a statement of our prospecting from the time of leaving until our return.

"Left Stanley on the 6th day of September with four animals packed with supplies, and proceeded up Van Winkle Creek and down Fountaine Creek, and camped for the night on the 7th. We reached Little Swift River, and next day Porter Creek. On the 9th we commenced prospecting on Main Porter Creek and its tributaries, for a distance of five miles up and down stream. We found gold in small quantities on nearly all the streams; in one place a piece weighing 75 cents, but in no place could we find sufficient to pay wages. The country is flat

and swampy, and the clay on the main stream and tributaries is, without any exception, near the surface, say from one to four feet. The bed-rock, wherever seen, is of slate of good character.

"On the 21st we left camp and moved to the Forks of Porter Creek, some 6 or 7 miles distant, and prospected on the tributaries and forks of Porter Creek. On the south branch of Porter Creek we discovered a quartz ledge—samples of which only assayed $2 per ton. Did not prospect it at all, except to collect a few samples to have assayed at Barkerville. On the E. N. E. branch of Porter Creek we sank a shaft 15 feet deep, but found no gold, and the bed-rock pitching toward the hill, and without a colour on it. We also prospected two small gulches emptying into the south branch of Porter Creek, but without finding gold in paying quantities. In the meantime three of the party had to cut out a trail to the summit of Cariboo Mountain, say 8 or 10 miles, and on the 28th we moved to the summit of Cariboo Mountain. Here we prospected two creeks on a fork of the north-east branch of Porter Creek, and the other a tributary of Swift River, rising in Cariboo Mountain and flowing in a south-easterly direction. We sank two holes on each, but could not get a prospect on either creek. In this place where we camped is the big quartz ledge of which mention was made last year in the report. We prospected on the ledge for about two days and found gold (free gold), quite visible to the eye, in three different places, but a sample assayed only $2.50 to the ton. We were careful to choose the poorest piece for assay.

"On the 1st day of October we left camp and moved over towards Snow Shoe Creek, and camped on the divide where the water flows both into Swift River and Keithley Creek. We prospected on the Swift River tributary, but owing to stormy weather, and our provisions becoming about exhausted, we were obliged to leave off before thoroughly testing the creek.

"We reached Barkerville on the 15th October. Throughout the whole of our trip the utmost good feeling existed among the whole party, and all seemed animated with a desire to strike something for the good of the district.

"The placer ground thought to exist in the locality traversed by us, is not there in paying quantities. The quartz must be our main dependence. It shall be our endeavour to enlist capital, between now and spring, to take hold and develop what, to us, seems the richest, largest, and best quartz vein in Cariboo District, if not in B. C.

"We have, &c.,
(Signed) "ALEX. PORTER,
"ALEXANDER SWAN,
"ARNOLD WILSON,
"WILLIAM H. TILLIE,
"SILA JOHNS."

REPORT OF THE SECRETARY OF THE DOMINION QUARTZ MINING COMPANY.

"BARKERVILLE, 14th November, 1883.

"*To the Members of the Dominion Quartz Mining Company.*

"GENTLEMEN,—I herewith beg to present a report of our trip to the Company's quartz ledge situated on Cariboo Mountain, and distance from Barkerville, viâ Snow Shoe, about 50 miles. The time occupied in reaching the ledge was four days, although in reality we were five, having to return on the fifth day for a part of our supplies left behind the day previous.

"The weather was most unpropitious, both for sight seeing as well as for working. A terrific storm of wind and rain set in on the night of our arrival, and continued uninterruptedly for four days and nights, and it was only by the greatest amount of labour and perseverance that we succeeded in accomplishing the object of our journey at all.

"I found the ledge fully up to the description given of it by the discoverers. It is situated on the northern slope of Cariboo Mountain; runs about 65° east of north, and 65° west of south, and cuts the mountain at its very apex. As near as I could judge, the ledge is exposed lengthwise for at least 4,000 feet; 1,500 feet of which crops out not less than 10 or 12 feet above the surface of the mountain.

"The condition of the weather, the position occupied by the ledge, situated as it is on the face of the mountain, where it slopes off at an angle of about 45°, and the nature of the snow, prevented us from venturing along that side of the mountain through which the ledge cuts. But I could easily see that on that side the ledge could be cross-cut by tunnels at any desirable depth, from 100 to 1,000 feet, at distances varying accordingly. The summit of the mountain,

traversing a distance of 2,500 or 3,000 feet, is capped with a species of bastard granite, underneath which lies slate. The ledge cuts the whole country formation at right angles, and stands nearly perpendicular with it. As near as I could judge it has not more than 2° or 2½° dip to the eastward. Hundreds and thousands of years have possibly elapsed since this mammoth ledge was formed, during which time all the natural agencies of nature have been directed against it, either for good or ill. The ledge being harder than the surrounding rock has resisted all the force of the elements, and now stands a monument of its own greatness, while the elements have oxidized and volatilized all the minerals near the surface subject to their influence.

"The ledge on the surface will fully average 10 feet wide; contains nothing base or impure so far as I could see, and literally in size and length dwarfs everything heretofore found in the Cariboo District. And, speaking from an experience of about 13 years in the mines of Idaho, Montana, Nevada, and Utah, I feel confident of its ultimate richness, and of its being a true fissure vein, and that when properly developed will produce more gold annually than was ever before produced in Cariboo's palmiest days.

"We had exceptionally rough weather all the time we were out. The snow-shoeing was execrable, and our loads exceedingly heavy; as a consequence of all this our stay had to be correspondingly brief on the mountain.

"We succeeded in getting off a couple of shots, and brought back with us about 25 or 30 lbs. of rock; a sort of general average. Hoping it, and the very crude description of the trip and results, will be satisfactory,

"I beg to remain, &c.,
(Signed) "W. B. SCHUYLER."

MR. STEPHENSON'S REPORT.

"FORKS OF QUESNELLE, B. C.,
"13th November, 1883.

"*To the Honourable the*
"*Provincial Secretary and Minister of Mines.*

"SIR,—I have the honour to forward herewith the mining statistics of Keithley Division of Cariboo District for 1883. The sum total of the yield of gold is about the same as last year, the difference, such as it is, shows in favour of the present year.

"Although the season has been a very dry one, it does not seem to have been much against the mining in this section, as it has given miners an opportunity of working the beds of some of the creeks which they could not have done had the water been as high as it has been for several years past.

"There has not been anything new found in this section for the past year, except on the Horsefly River. About the latter part of August, the Chinese who were working there found, at a lower level than that which they had been working, much better pay than they have had for the last three years; it caused some little excitement in this section, and I think will be the means of drawing quite a number of men to Horsefly the coming season, and I hope the cause of having that much-neglected section of this district more thoroughly prospected than it has been heretofore.

"I have, &c.,
(Signed) "W. STEPHENSON,
"*Government Agent.*"

CASSIAR.

MR. VOWELL'S REPORT.

"LAKETON, CASSIAR, B.C.,
"3rd October, 1883.

"*To the Hon. the Minister of Mines,*
"*Victoria.*

"SIR,—I have the honour herewith to forward the 'Mining Statistics' for 1883, as well as my annual report upon this district.

"Owing to the loss of the steamer 'Grappler' and to other untoward occurrences during the commencement of the mining season, the population has considerably decreased.

"Dease, Thibert, and McDame Creeks, as also their tributaries, are to all intents and purposes 'worked out' as regards surface claims, and the prospects on either for the successful working of 'deep diggings' are not very encouraging.

"Nothing new has been discovered, nor is there any promise of such a resuscitating event taking place this year.

"Several miners have been down the Liard River, but their efforts having been directed towards following up the prospects obtained in Sayyea Creek some years since, which proved unsuccessful, nothing of any moment has resulted from their enterprise.

"The Chinese, owing to the accident that befel their party in 1882, when they lost four of their comrades with boat and load of supplies, &c., were deterred from again venturing in that direction.

"A prospecting party, consisting of four men, provided with one year's provisions, left Dease Lake on the 27th ultimo, bound for Highland River and its immediate vicinity. That river is in a north-westerly course some 220 miles from Dease Lake, and empties into the Liard River about 20 miles from the confluence of Dease and Liard Rivers. The country to be prospected is supposed to be within the North-West Territory, and to be close upon the boundary of Alaska. The outfit for the above expedition cost something over $1,200.

"The following figures will give as close an approximate as can with any certainty be arrived at, touching the amount of gold taken out this year in Cassiar, viz.:—

Dease and Thibert Creeks, etc	$ 43,000 00
McDame Creek section	65,000 00
Localities not particularized	11,000 00
Shewing an aggregate of	$119,000 00

"On Dease Creek the summer freshets having been of long continuance, delayed the opening of the few claims still worked by the Chinese, and the fall freshet having carried away several wing-dams just as they were completed, utterly destroyed their season's work.

"The tunnel claims on that creek have so far proved unprofitable, several having been temporarily abandoned, with the intention, however, of again trying them during the winter months.

"On Thibert Creek very few claims have paid over wages, but from prospects obtained in the deep ground several men are still engaged in mining there, and will be for many years.

"It is still believed by experienced miners that the hills and benches of McDame Creek are tolerably rich in gold, and would pay fairly if they could be worked to advantage. Owing however to the high rates demanded for all mining supplies, and to the poverty of the miners, such a prospective source of profitable employment is of little actual value at present. A few claims on that creek have paid during the past season, and one or two companies intend prospecting on the second and first North Forks during the close season.

"In consequence of early frosts, and a protracted drought at the time when irrigation was most needed, the crops upon the different ranches on the Stickeen have proved a comparative failure.

"The sum of $500, authorized by the Government to be disbursed in this district for 'prospecting' purposes, has not yet been utilized, next spring being considered the best time to have that money expended, etc.

* * * * * * *

"Three deaths have taken place in this district during the present year, viz., Perrin Kent, packer, at Glenora; M. Bradley, miner, at Thibert Creek; and Jno. A. Fraser, miner, at Sayyea Creek. These deaths have been duly registered. A clergyman of the Church of England has come to reside in the district permanently. He has been well received by the people generally, and the fact of his being skilled in medicine and surgery has made his advent particularly agreeable to all. Jos. Clearihue and Robert Wilson, Esquires, have been sworn as J.P.'s for Cassiar, during the present year; the former resides at Laketon, and the latter in McDame Creek section. The number of men employed as miners and otherwise in the district during the past season, exclusive of Indians, has been about 225; of these, some 115 souls will pass the winter in the district.

"The weather has lately been remarkably fine, and a late or protracted 'fall' is anticipated.

"Enclosed will be found a list of prices, giving the rates demanded and obtained for all such articles as are therein enumerated.

"During the last twelve months, crime has been unknown at Cassiar, and litigation of any kind has been of rare occurrence.

"I have, etc.,
(Signed) "A. W. VOWELL,
"*G.C., S.M., &c., Cassiar.*"

LILLOOET DISTRICT.

MR. SOUES' REPORT.

"CLINTON, B.C.,
"November 27th, 1883.

"*The Hon. John Robson,*
"*Minister of Mines, Victoria.*

"SIR,—I have the honour to enclose herewith the Mining Statistics, and submit the following general report of gold mining in Lillooet District, for 1883.

"The total yield, which I have ascertained from reliable sources, is $68,342—a considerable increase on that of last year. This sum is the amount acknowledged to have been bought by white and Chinese traders, resident in Lillooet, Dog Creek, and Clinton; but I am quite sure that it falls very far short of the actual yield. One merchant here, informs me that he weighed last week over $1,900 (not included in the above amount) in dust, in the hands of one private individual leaving the district for the winter.

"The whole of the gold mining in the district may be said to be in the hands of the Chinese, and from them it is utterly impossible to get at anything near the truth.

"In my report of last year I gave the leakage by this class at one-third of the ascertained figures, but I believe one-half would be a great deal nearer the mark.

"The South Fork of Bridge River, referred to in Mr. Phair's report of last year, has had a good deal of prospecting done on it this season, by a party of 8 whites and several Indians, with gratifying results. The gold found there is coarse and of superior quality, $16.50 being paid for it in Lillooet. Five Indians from that locality last month sold $280 worth of coarse gold to a white trader in Lillooet; amongst the lot was one piece weighing $17. The whites and Indians are working about five miles apart, which proves that the gold is not confined to one spot. High water, however, is a drawback to a long season's work. From this locality good results may be anticipated next year.

"A quartz ledge, on McGillavrey's Creek, Anderson Lake, discovered by a party of white men a few weeks ago, gives favourable indications, gold being visible to the naked eye in some of the rock roughly broken up. The party intend driving a prospecting tunnel on the ledge during the winter months.

"Desultory mining throughout the district, along the line of Fraser River, has largely increased this year from the influx of Chinese from railway works.

"Registered claims by old companies are about the same in number as last year.

"I have again to report no work done on any of the claims on the Big Slide Lode during the past year.

"The district allowance of $500, in aid of prospecting parties, has not been drawn on this year. If available for next year, and suitable men can be found desirous of going out, I would suggest that two parties be assisted in prospecting in the Chilcotin country. From information received, I have every reason to believe good results might be anticipated.

"I have, &c.,
(Signed) "F. SOUES,
"*Gold Commissioner,*
"*Lillooet District.*"

"CLINTON, B.C.,
"December 5th, 1883.

"*The Hon. John Robson,*
"*Minister of Mines, Victoria.*

"SIR,—By mail to-day I have the following information from Mr. Phair regarding the Bridge River Mines, which I deem advisable to forward with my report of the 27th ultimo.

"Mr. Phair's letter is dated December 1st, in which he says 'two men have arrived here 'to-day bringing with them over $600 in dust, the result of a month's work. They made from '$8 to $14 a day to the hand, and say they can work most of their claims all the year round, 'except the cold winter months, they being situated above high water mark. They return in 'the spring.'

"I have, &c.
(Signed) "F. SOUES,
"*Gold Commissioner,*
"*Lillooet District.*"

YALE.

MR. DEWDNEY'S REPORT.

"YALE, 8th November, 1883.

"*To the Hon. the Minister of Mines,*
"*Victoria.*

"SIR,—I have the honour to forward, herewith, mining statistics for the Yale and Hope Divisions.

"I am sorry to inform you that mining has been very slack this season, on account of the Hill's Bar Flat, opposite Yale, proving a perfect failure, there being only one or two Chinese companies working, with poor remuneration for their labour.

"The Queen's Silver Mining Company, about one and a half miles up Yale Creek, commenced running a tunnel early this spring, to test the quartz lode in that vicinty, but, on account of the company closing down suddenly, about two months ago, I am under the impression that they think it will not pay sufficiently to continue carrying on the work. A few Chinese are working along the banks of the Fraser River. What amount of gold they are taking out is impossible to come at, but I should imagine from $1 to $2.50 per day.

"I have, &c.,
(Signed) "W. DEWDNEY,
"*Gold Commissioner.*"

KAMLOOPS.

MR. TUNSTALL'S REPORT.

"KAMLOOPS, December 4th, 1883.

"*To the Hon. the Minister of Mines,*
"*Victoria.*

"SIR,—I have the honour to enclose the mining statistics appertaining to the Kamloops District, for the current year. The yield of gold, last season, was much smaller than usual, owing to the scarcity of water during the latter portion of the summer.

"The amount granted by the Government to aid in prospecting has been expended in purchasing an outfit, and defraying incidental expenses, for Messrs. Ratchford and Myoff, two experienced miners. They left here last fall, and proceeded, viâ Seymour, to the Big Bend of the Columbia, whence they intended to take a boat and go up the river to a certain point, where they would winter, and be able to make an early start in the spring. The result of their operations will be communicated to me by first opportunity, and forwarded to you when received. I have, &c.,

(Signed) "G. C. TUNSTALL,
"*Government Agent.*"

KOOTENAY.

Mr. Kelly's Report.

"Wild Horse Creek,
"December 15th, 1883.

"*To the Hon. the Minister of Mines,*
"*Victoria.*

"Sir,—I have the honour to enclose herewith the mining statistics for the District of Kootenay, for the year 1883.

"From the most reliable sources, I have received information that the yield of gold from Wild Horse Creek is about $26,000—$1,000 or so more than it was last summer. The increase would have been much over this sum but that the hydraulic companies could not, for want of water, work as long as they did last season. These companies lost a month's work this summer from this cause.

"As evidence of the value of mining property, I may remark that a claim has been sold here, this summer, for $6,000.

"Perry Creek, I regret to say, has not been worked this season, yet some miners here set a high estimate on the value of Perry Creek mines.

"There is one claim on Weaver Creek. It has paid fairly for the work done on it. Water was scarce, or it would have paid much better.

"One claim has been worked on Palmer's Bar, part of this summer, which yielded $700.

"On Bull River, there has been some mining done for the last three months. Up to this time it has only been crevice mining, but there must have been, from what I have learned, at least $800 taken out of this river this year.

"I have the honour, also, to inform you that gold has been discovered on a creek called 'Cannon Creek,' about ten miles above where the Canadian Pacific Railway crosses the Columbia River, viâ Kicking Horse Pass. This creek was discovered in October last, when I was settling important mining cases at Kootenay Lake mines, 250 miles from here, but I am informed by miners who were there, that there are both bar and creek diggings on this creek. The prospects are very encouraging, but it may be said of these mines, that they are only being prospected. The gold found is coarse; one piece weighed as much as eight dollars, and it is supposed $1,000 have been taken out of the mines on this creek since it was discovered. It is about 160 miles from here.

"Three mineral locations have been worked on Spallumcheen River this summer.

"A mineral claim has been located, this fall, on Ille-cille-wait River, some 20 miles from Arrow Lakes.

"The mineral locations, or quartz claims, at Kootenay Lakes, have increased in number, since last year's report, from four to nineteen.

"From the prospects I saw at these mines, when I was there in October last, I am convinced there will be, in two years from hence, an extensive mining camp, where capital will be expended in labour and otherwise.

"Ledges or lodes of the ore found in this district are numerous. Prospectors on the mountains about these Kootenay Lakes, have had very little trouble in finding claims.

"Two claims recorded at these mines, this season, were bonded, or sold conditionally, for $20,000. I have, &c.,

(Signed) "Edward Kelly."

COAL.

The following table shows the output of each year from 1874 to 1883, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.,
"5th February, 1884.

"*To the Honourable John Robson,*
"*Minister of Mines.*

"SIR,—I have the honour, as Inspector of Mines, to respectfully submit my report for the year 1883, in pursuance of the 'Coal Mines Regulation Act, 1877.'

"The collieries which have been in operation during the year are the following, viz.:

"The Nanaimo Colliery, belonging to the Vancouver Coal Mining and Land Company, Limited, which consists of Chase River Mine, South Field Mine, and No. 1 shaft on the Esplanade, Nanaimo.

"The Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons, comprising Wellington Mine, No. 3 shaft, Wellington, Adit, and No. 4 shaft, Wellington.

"The East Wellington Colliery of R. Chandler, Esq.

"The aggregate output of coal in the year 1883 from the above named collieries, amounted to 213,299 tons, which, with 2,885 tons in stock on the 1st January, 1883, made a total of 216,184 tons of coal for export and local consumption.

"In 1883 the exports of coal from Vancouver Island amounted to 149,567 tons, the principal part being shipped to San Francisco, and ports in California; other shipments were made to Seattle, Washington Territory (gas coal), to Alaska, Mexico, Hawaiian Islands, and to mail steamships and vessels calling.

"The year's sales for local consumption by steam-vessels, manufactories (including gas works), and for use in households, &c., amounted to 64,786 tons.

"The stocks on hand at the end of the year 1883, were 1,830 tons.

"A comparison of the output of 1883 (213,299 tons) with the output of 1882 (282,139 tons), shows a decrease amounting to 68,840 tons in the output of 1883; one result of which has been a considerable falling off in the exports of coal for the year. The sales for local consumption during 1883, have, however, exceeded those of 1882 by 8,625 tons, which is a gratifying feature in our coal trade.

"The following table of exports and local consumption of coal since the Mining Act of 1877, will exhibit the extent of our trade during the past six years:—

Year.	Exports, tons.	Local consumption, tons.
1878	164,682	26,166
1879	192,096	40,294
1880	225,849	46,513
1881	189,323	40,191
1882	232,411	56,161
1883	149,567	64,786

"With regard to the decrease of output in 1883, I may say that when I last had the honour to present my annual report, the outlook and prospects were very promising for a greatly increased production of coal, but during the past year several of our mines have experienced some of the vicissitudes to which coal mining is naturally subject, such as heavy inflow of water, faults, 'pinch-outs' and 'wants' in the seams, which you will find referred to

in my remarks upon the respective mines, and those troubles have hampered mining operations and occasioned a considerable diminution in the yield of coal. The strike at the Wellington Colliery was also an unforeseen occurrence, and reduced the usual output of that colliery during a few months. While the decrease of output for the year 1883 is thus accounted for, you will be pleased to gather from my report upon the workings of the mines that our present prospects are most encouraging for the recovery of lost ground, and the attainment of a much larger aggregate output of coal in the year 1884.

"No relief has been extended to our coal industry from the pressure of the Dominion tariff, or from the United States impost of 75 cents a ton on our coal entering their ports; but on the contrary, since my last report, the time for which the drawback of half duty on blasting powder was allowed has expired—in April last—and, therefore, powder imported (or used) since that date is subject to the full duty of three cents per pound. I beg leave to refer to former reports for full particulars of the bearing of the tariff, &c., upon the coal trade of this Province.

"NANAIMO COLLIERY.

"DOUGLAS PIT.

"At this mine there has been very little coal taken out, and what was got was from the pillars (of coal). Now there is no mining being done here, but the water is being kept out.

"CHASE RIVER MINE.

"As mentioned by me in a previous report, the workings of this mine are from a slope about 500 yards long, to what is known as No. 4 level. From this level no coal is being mined at present, but about 400 yards along the level there is a slant which is down about 400 yards. This place has not been worked by the company during the year which is past, as they were much troubled with water coming in, so that it got nearly filled, and that has not been got out yet, but there is a likelihood of its being empty soon, as they have got a large and powerful steam-pump ready to start as soon as the pipes are connected with it. The slant itself makes very little water, and if it had not been for the water going in at the top, it would have been working steadily along. The only mining being done in this place at present is from the No. 5 level, or the first level down the slant. The coal below this is from four to six feet thick, very hard, and of good quality. I think I will not be wrong in saying, in about two months, or less, that there will be quite a large output of coal per day from this place. The mining here is on the pillar and stall system—taking out the pillars (of coal) after the coal is worked from the stall to its destination.

"Ventilation is good. The last time I was down—which was in December—the air in circulation, near to the face of the workings, was 340 cubic feet per minute to each man, being conducted well into the face by brattice.

"During the past summer the company put a large pump down the slope, which is now working, and doing its work well, and, so far as the winter has gone, it can keep the water out, and not work very fast to do that. As the winter season is the time when the water comes in freely, and the present pumping machinery is master of it, the Manager is now satisfied that the mine will be kept dry without causing any delay to the working of the mine. This mine must be very expensive to work. The coal is generally good and of excellent quality, but the company are very much troubled with faults—a continuation of them, one after the other. Considering the difficulty they have here, they keep the mine safe for the working man. So far as personal observation and inspection can find out the dangerous places, they are made secure as soon as possible. There is always plenty of timber on hand, and any other thing that may be wanted for the use of the workman.

"SOUTH FIELD MINE.

"This is a new mine started by the Vancouver Coal Company, about four miles to the south of Nanaimo, and known here as the 'South Field Mine.'

"This mine also is entered by a slope; it has but little pitch to it; from the entrance to the face it is about 300 yards; at the face the coal is three feet thick, hard, and of good quality; it has not been all as thick as this, but for quite a distance the coal has been good, and improving in thickness as they go in. At 150 yards, or about half-way down the slope, there is a branch slope going in a northerly direction, and being nearly on the pitch of the coal; this is also down about 150 yards. The coal here is not quite so thick as in the other slope; it is

about four feet thick, and is good and hard. There are levels being driven from both sides of those slopes, and stalls from the levels. In most of the places the coal is good, with conglomerate rock for a roof, which is very strong and hard, there not being much danger of any of it falling, unless one continuous large space is worked out.

"This mine is ventilated by a large furnace at the bottom of the upcast shaft. Ventilation is good, being conducted on the separate split system. The last time I was in the mine there were 200 cubic feet of air per minute in circulation for each man employed in the mine. There is little or no gas seen in this place, and very little water to contend with.

"There is the prospect of an extensive and valuable mine here, as away to the dip, and ahead of this mine, there was a series of bore holes put down some years ago, which proved that the coal they went through with those borings varied in thickness from six to twelve feet; and there was another one put down last summer, about 300 yards distant, at right angles from the entrance and course of the slope, which proved the coal at this place to be about seven feet thick.

"A steam-engine is placed about 150 yards from the entrance of the slope, for hauling the coal out to the surface. The coal is brought out by what is known as the endless rope system; the main rope goes direct from the engine to the top of the branch slope, here there is a wheel on which the main rope works; besides the main rope, there are two other ropes working on this wheel; one of the ropes continues down the slope, about 150 yards, while the other goes down the branch slope about the same distance; each rope having a large pulley fixed at a proper place for the rope to work round; when at work the rope keeps going, having short coupling chains, with a hook on one end for the car, and a 'grip' on the other end, which they can take hold of the rope with while in motion; the cars can also be disconnected by sloping the rope, so that the cars can be taken off the lower ropes when they get to the wheel at the top of the branch slope, where they are coupled to the main rope, thus forming a steady run of cars coming out of the mine.

"At present the company are getting about 250 tons per day from this mine, and this output will be greatly exceeded soon, as they are putting new miners to work daily.

"No. 1 Shaft at Esplanade, Nanaimo.

"This is what is known, about here, as the Company's big shaft on the Esplanade at Nanaimo. In more respects than one it might be called big; in the first place it may be called by that name, as it was a great undertaking on the part of the company, knowing the depth they had to go—viz., 628 feet; but they did not know what water they might have to contend with; as they progressed towards the coal they were sure to have fresh water, and, owing to this shaft being so close to the sea, it was possible to have a leakage from that quarter; but the company had confidence in their property as well as in the gentleman into whose hands they had trusted the carrying on of such works. This man has had great experience in this kind of work in England, but of such large proportions, that the works here must seem small to him—Mr. James Beaumont, Mining Engineer, of Oughtibridge, Yorkshire, England.

"In May, 1881, Mr. Beaumont commenced the sinking of this shaft by bringing in an open cut from the beach, about 20 feet deep. Not having got the rock, they continued to sink about 20 feet further, at which place they found the rock hard and solid. All this time the shaft was being put down 24 feet in diameter. They then started to build from the bottom towards the surface with segment blocks of timber 30 inches long, with the end of the timber to the shaft, leaving the space inside 18 feet in diameter, which is the size of the shaft, filling it solid between the blocks and the wall with clay; this being completed to the surface, and everything made ready on top, the water was taken out. The shaft was found to be almost perfectly dry, the surface water being shut out from the shaft. Now the work of sinking commenced, and they made good progress until they got about half-way down, when the water began to flow in freely; but for all that good progress was made, until the water got too much for the hoisting engines (a pair of 16-inch cylinders), when they had to quit work in the bottom until they got another and larger engine; so the present engines were erected. These engines are the largest ones about the collieries of British Columbia, being double engines of 30-inch cylinders, with 5 feet stroke, and winding drums of 14 feet diameter. Everything being ready, the water was got out and work resumed in the bottom. Things went all right for a time, but again they found a gas to be coming out of the rock, and the water being strongly impregnated with it, became painful to the eyes, so much so, that the greater part of the sinkers had to leave off work at times. To overcome this they had to put up a small fan, in addition to the one in use, to dilute this gas so that the men could work, and then only four

hours at one time, as it was impossible to stand it longer. Now everything went all right, with great expectations of reaching the coal soon, and in that they were not disappointed, for on the 26th October the news was sounded from the bottom that the coal was found. As the rock was cleaned off the coal, they found it was hard and of good quality, as the Douglas coal generally is, and 7 feet 4 inches thick. Now there are two drifts run into the coal for a considerable distance. About the bottom everything is made secure, in the most workmanlike manner, with large timbers, some of them 24 inches square, and lighter ones as they go away from the shaft. One of the drives above referred to, goes towards the south. In this one the coal has gradually thickened so that it is now 11 feet thick. The other drive is towards the north. In this place it keeps about the same as at the shaft, 7 feet 4 inches. Now the company are putting up the shaft head gear, &c., and are laying sidings from their railway which is already laid, and the locomotive taking cars over it with the coal which is brought from the shaft. As ships are waiting for coal it is not necessary to store it on top.

"As I have said previously that all these works, and the machinery in and about this shaft, were under the control and supervision of Mr. James Beaumont, the Company's Mining Engineer, great credit is due to him for his engineering skill and caution; always having an eye for the care and safety of those employed under him, knowing that there has not been an accident to anyone at these works, which have extended over a period of 2½ years, from the breaking of the surface to the winning of the coal, 628 feet down.

"The people of Nanaimo are to be congratulated on such a finding, and the Province in general, but the Vancouver Coal Company in particular, as they have the prospect of a good and extensive mine, where, it is to be hoped, they will get returns for the great outlay they have made.

"In addition to the above works, you will have observed in the report of 1882, that there is another shaft belonging to this company, 75 yards north of No. 1 shaft, which is in a fair way of getting to the coal soon, being now down 480 feet; and it is expected that the coal will be got at 600 feet from the surface. This (No. 2) shaft is 16 feet in diameter, inside of blocking, which is done similarly to the No. 1 shaft, so that if everything goes as it appears to do at present, that they will have the coal in less than two months, and by that time the mining from No. 1 shaft will be near, so that they will soon get a connection there, and that is required in all extensive mines.

"I here again take the opportunity to mention that as in No. 1 shaft, so in No. 2, there has not been an accident of the smallest kind to anyone employed about it. I hope, as well as the Managers, that they may long continue to keep a clean sheet for want of anything of the kind to enter on it.

"I hope to see those two shafts a success, so that the coal may be got out from them as such undertakings deserve, so that at the close of another year the output of coal will be greatly increased, and the company have a good income for the capital invested.

"WELLINGTON COLLIERY.

"Wellington Mine.

"This is the slope mentioned in a previous report as being down about 1,000 yards. There has not been anything done to the face of the slope during the year which is past, the face of it being stopped at a down fault. This is the fault which separates the workings here from the workings of the No. 3 pit. There are three levels working from this slope, two on the one side, known as 7 and 8 levels west, the one on the other side is known as 10 level east. The coal is mined on the pillar and stall system, driving the stalls to their destination, then commencing at the inside to the pillars, taking out as they come back. This slope is one of two main entrances to this mine; the other being what was mentioned in a previous report as the adit level. There are four shafts to this mine, but there is no coal coming out of them; one is a pumping shaft, and one is the return or furnace shaft, the other two are in a position so that in case of an accident to any of the other places the men could be got out. By those two places, the slope and adit, all the men go in and come out. At those places the coal is taken out. In them everything is made as safe as timber and workman can make it. There is a travelling way on the greater part of this slope, six feet wide from the rails, besides there are man-holes, as places of refuge, at short distances from one another, cut into the side; those holes being washed frequently with lime, so that they may be easily seen in case of danger.

"The coal in this mine varies in thickness from 6 to 10 feet; as for quality that is well known, both in this Province and California, as being of good quality both for steam and household purposes.

"I have frequently examined this mine during the past year. I always make it my study to make those inspections when the miners are at work, so that I can see the state of the mine when they are working, and to hear if there are any complaints about anything which they think is not in accordance with the Mining Act, and I frequently talk to them about the dangers of the roof, that they cannot be too careful in attending to the securing of it, as it is the falling of the roof which is the cause of quite a number of the accidents during the past year. And I may here say that the miners should be careful in all things (as well as the Manager), for the smallest neglect which, as he may think, will only be for a few minutes, may cost him his life.

"Ventilation of this mine has for its motive power a large furnace at the bottom of the upcast shaft; the in-takes being the slope, adit level, and three shafts. Ventilation is very good, being conducted on the separate split system, with the main divisions, or one to each level; and as I have already said, the workings here are on the pillar and stall system, so that when a sufficient distance has been cut, there is a connection made with the adjoining stall, so that very little brattice is required, the mine being almost entirely free from gas, so that the brattice is not required to be close up to the face, and if it was it would be sure to be broken down sometimes, as a miner told me it was not unusual to put four pounds of blasting powder in one blast. It takes about 200 cubic feet of air per minute to each man, and that is little enough conisdering the powder smoke that has to be cleared away. As I have said, there is little or no gas met with, yet the manager takes the precaution to have all the old workings examined frequently, as well as all the working places every day by the fireman with a safety lamp, to see that everything is clear and in a fit state for the miners to proceed to work with safety. The fireman, to show proof that he has been in the stalls, chalks the day of the month on the face of the coal, so that there can be no mistake as to his having been in. You will have seen that there are five different ways in and out of this mine. The miners can come out from three of those at any time; but there are only two where they must go in, and those are the ones leading past the fireman's station, as they cannot go past without being told to do so by the fireman. I always find a good stock of timber on hand, and every other thing which would appear to be necessary for the safety of the workmen and the working of the mine.

"No. 3 SHAFT, WELLINGTON COLLIERY.

"In this mine, as you will see in a previous report, the workings are from a slope, the top of which is about 75 yards in a southerly direction from the bottom of the shaft. At this place a steam-engine is fixed to haul out the coal and what water there is; of the latter there is but little, as the mine is very dry. This slope is down abont 750 yards, of a gentle grade, with good coal all the way, varying in thickness from 8 to 10 feet. Now they have got into what is known as the basin of the Wellington coal field; in the trough of this basin they are driving the levels from the bottom of the slope both ways, the coal rising and coming into the levels from both sides. There are two other levels from this slope, branching off about half-way down; in one of these places the coal is not so thick as I have mentioned it to be in the slope. This mine—as are all the other mines belonging to Messrs. Robert Dunsmuir & Sons—is worked on the pillar and stall system; and as they are now underneath the valley of the Millstone River, they are leaving large pillars of coal, at present, to support the roof with the surface. At the deepest place, the coal lies about 400 feet from the surface; and as this is a valuable mine they are using great precaution, so that no accident may happen to it from an inflow of water from the surface.

"Ventilation here is good, the motive power being a large fan, worked by a pair of coupled steam-engines. This fan is 30 feet in diameter and 10 feet wide, exhausting on the upcast shaft, and not requiring to run above 20 revolutions per minute, giving all the air that is necessary for all the men employed here. In addition to the fan, the engine at the top exhausts into the fan shaft. This mine is also aired on the separate split system—viz., four divisions, one to each level; the air being conducted around, and well into the face by brattice or otherwise, after going round the workings comes back again on their respective return, when they again all join into one and go out at the fan shaft. There is not much gas seen in this mine now, although at one time it gave considerable trouble; but since they got connected with the fan shaft, the airways being large and having plenty of air, they now see very little gas. The fireman, when examining the places previous to the miners going to work, sees a little sometimes, which makes him cautious and puts him on his guard.

"I always find plenty of timber and any other thing that may be necessary for the use of the miners to protect themselves when at work.

"No. 4 SHAFT, WELLINGTON COLLIERY.

"You will see in a previous report that this is the shaft which was put down on the top of the bluff overlooking the valley of the Millstone River. There has been much work done here, both on the surface and in the mine. The coal mined in this pit is what is known as the Wellington coal; it varies in thickness from 8 to 12 feet, leaving about 2 feet of hard coal for a roof. This coal is of a first class quality, and looks well for a good and extensive mine. There have been some small drawbacks to the mining here, as there was a small 'fault' in the coal close to the shaft; the workings now are all clear of it, and the coal looks well. This is also worked on the pillar and stall system. They cannot work this very extensively until they have another outlet from the mine. It was generally thought by the manager at first when they got the coal here, that there was a large down-throw of the coal going from this place to the workings of the No. 3 Shaft—that being the only place for a connection without putting down a second shaft from the surface; but after they had worked in some distance, the manager began to see that there was a chance to get down without any serious trouble. They started a slope for the purpose of making a connection; now they are down about 200 yards, without any fault to hinder their progress, the coal being good and hard all the way, but has a good pitch to it. Now they have got so low that they are satisfied that there is nothing in the way to hinder them but good coal, so that about the 15th of February they expect to get through on the workings of No. 3 Shaft, the accomplishment of which will be a great relief to both shafts; and they will be able to mine more extensively, as they will be at liberty to put on all the men they can find employment for. At present, the Mining Act limits them to a certain number until there are two or more outlets.

"Ventilation of this shaft is by a steam-jet. One part of the shaft is partitioned off exclusively for the upcast. This mine is particularly well ventilated. The air is split at the shaft to each side, taking the level for the intake, returning by the face of the stalls, and leaving the stalls by the return airway direct for the upcast shaft. When this shaft was sunk, it gave off much gas; but ventilation being good, and great care used, there was nothing to fear, always being well supplied with safety lamps. In the levels or headings gas is sometimes given off, which comes out of the floor of the coal; and sometimes a streak of it would collect on the lee side of the timber which the brattice is fixed to, at the same time the air was blowing past strong. Work has gone on quite satisfactorily during the year that is now past; and now that they are about to have an opening another way soon, it is to be hoped that we will be clear from accidents from gas in the year we have entered upon.

"The railway has been completed to this shaft in connection with the North Wellington railway; this branch is about one mile in length. The conductors have been put in the shaft, fixed head gear built, and shutes erected, and every other appliance is there for a mine that is likely to have a large output of coal per day; and the outlook at present is that this shaft will give a good account of itself to Messrs. Robert Dunsmuir & Sons, its owners, for the current year, and it is to be hoped for many years to come.

"EAST WELLINGTON COLLIERY.

"You will have observed in the Report of 1882 that this Colliery, with its present works, is situate in the valley of the Millstone River, below the Wellington Colliery. At the time of the above-mentioned report, they had got their shaft down about 200 feet. Everything looked favourable for getting the coal good. When they got down 250 feet, or to where the coal should be, they found it but thin and faulty, being all mixed with rock. They got everything fixed and put in order on top, conductors into the shaft, and everything done as if the coal was good and thick. Then they started two drifts, one on each side of the shaft; they were run a long distance, the coal not improving much—sometimes none—yet they kept on; when about 600 feet from the shaft it began to shew signs of getting better and improving in thickness, until it got 8 feet thick; that was good while it lasted. At different times it looked good, and in a few yards would almost pinch out. It is a little better at present, but not regular, and far from it. They have, however, been getting out some coal, as you will see by the returns.

"There is a prospect of this being a good and extensive colliery yet, as the coal has been found good both up and down the valley from where the works are, and it is to be hoped the East Wellington Company will also find it good. There is a large amount of capital invested here. Besides the works about the shaft, they have a railway, laid with steel rails, 3½ miles

long, with wharf, and two locomotives, 20 4½-ton cars, and every other appliance for taking away and shipping a large amount of coal per day; their shipping point being Departure Bay. In addition to the above, they have a large sawmill (the same as mentioned by me in 1882 Report as in course of erection). Attached to this mill, there is a planer and every other thing that is necessary for a mill, with steam-engine for working the same. There is also a branch line from the railway to the mill, so that if it is found profitable lumber can be shipped, there being plenty of timber handy to the mill; but it may be reasonably expected that the proprietors of East Wellington Mine will soon be fully employed in carrying coal, so that the timber can stand till some future day.

"ACCIDENTS IN AND ABOUT THE COAL MINES OF BRITISH COLUMBIA FOR THE YEAR 1883.

"16th January—Samuel K. Lowe, sinker, was killed by falling down the East Wellington Colliery sinking shaft.

"1st February—Thomas Rickard got a blow on the side with a piece of timber when at work putting in conductors in No. 4 shaft, Wellington Colliery.

"3rd March—Peter Morrison, miner, was injured about the back by a piece of coal falling on him from the roof while at work in No. 4 shaft, Wellington Colliery.

"8th March—Ah Tuck (Chinaman) when travelling up the slope in the Wellington Mine, not taking the necessary precaution by going into one of the man-holes, was caught by the empty cars coming down, whereby he got his leg broken.

"12th March—George Fisher, miner, when taking out pillars (coal) in the Douglas Pit, got his leg broken by a piece of coal falling on it.

"17th March—David Hardy, miner, was bruised about the body by coals thrown from a shot, which blew through from the adjoining stall they were working at to connect, in No. 4 shaft, Wellington Colliery.

"7th April—Rorry Dunlop, miner in No. 3 Pit, Wellington Colliery, was burned about the hands and face by an explosion of gas. He was working with a safety lamp. The brattice man was sent to put in brattice, being also provided with a safety lamp, but came in without using it, kindled the gas with his naked light, hence the explosion and burning.

"23rd April—Joseph Randle, while repairing pump-rods in the Douglas Pit, got one of his ribs broken by a piece of timber he was using to hold the rods up with, and which slipped.

"2nd May—Henry Hindle, timber-man, was killed by a cave from the roof while at work renewing timber in No. 4 Pit, Wellington Colliery.

"5th May—Samuel Harris, miner, was injured by a fall of rock from the roof while at work in his stall in No. 3 Pit, Wellington Colliery.

"5th May—Frank Ghilioni, miner, was injured by the premature explosion of a shot in No. 3 Pit, Wellington Colliery.

"1st June—Ah Bone (Chinaman), car runner, got his arm broken by a car going off the rails in the No. 3 Pit, Wellington Colliery.

"29th June—Robert Kilpatrick, miner, was slightly burned by the explosion of some loose powder, kindled by a spark from his lamp, being in the act of getting ready to charge a shot in the Wellington Mine.

"18th August—John Johnson, miner in the East Wellington Colliery, was seriously cut in the face by coals thrown from a shot which was fired in the adjoining stall, which blew through on him, after being told to get out of the way, but did not do so.

"25th August—Ah Lum (Chinaman) was slightly injured by a piece of rock falling on him from the roof, in one of the stalls in the East Wellington Colliery.

"8th September—Yum Lee (Chinaman) had his leg broken by a piece of rock falling on him from the roof, while at work in one of the working places in the East Wellington Colliery.

"5th October—Chinaman No. 10, got his arm broken in two places while at work running cars in No. 4 Pit, Wellington Colliery.

"16th October—John Meakin, miner in Chase River Mine, was slightly burned about the face and hand by an explosion of gas, when he returned to the face, after he had fired a shot.

"29th October—Ah Quong (Chinaman), mule-driver, was severely injured by getting jammed between the cars in the Wellington Mine. He died on the following day.

"6th November—Lee Wing (Chinaman) was severely injured about the back by getting jammed between the cars at the outside of the South Field Mine; at the same time he should have been at work in the mine.

"10th November—Simon Joy, miner, wrenched one of his legs when coming off the cage in the No. 3 shaft, Wellington Colliery.

"15th November—Ah You (Chinaman) was slightly cut about the face and arms by small pieces of coal thrown from a shot, which blew through from the adjoining stall, in the Wellington Mine.

"20th November—Henry Bolton, deputy at Chase River Mine, got the small bone of his arm and one of his legs broken by a roller from the pump-rods getting out of its place and going down the slope, striking him while on the descent.

"3rd December—Ah How (Chinaman), when lowering a car down an incline in No. 4 Pit, Wellington Colliery, got foul of the rope, whereby he got one of his legs broken.

"19th December—David Morris, miner, was slightly singed by an explosion of gas in the East Wellington Mine. He was told by the fireman all was clear; Morris went in some time after and kindled some gas which had collected in a hole in the roof.

"20th December—Sin Kee (Chinaman) was bruised on the back by a piece of rock falling on him from the roof in one of the working stalls in the East Wellington Mine.

"21st December—Tong Kee (Chinaman) was seriously injured by a piece of rock falling on him from the roof in a stall of the Wellington Mine.

"28th December—Ah Yune (Chinaman), miner, was killed by rock falling on him from the roof in the Adit Level, Wellington Colliery. He had fired a shot, which blew out four props. By the evidence taken at the Inquest, he was in the act of putting the timber up again when about one ton of rock came down on him.

"I am sorry to have to make a list of so many accidents—for the year that has closed—both serious and fatal; although some of them were slight, yet they come up to 23 in all.

"Seven of them were by falls of rock from the roof; two, by falls of coal; four, by coal thrown from shots; six, by the cars in the mine; three, by explosions of gas; one, by explosion of loose powder; one, when coming off the cage; two, when fixing pumps; and two, in shafts. You will perceive that four of these cases were fatal: one, by falling down a shaft; two, by falls of rock from the roof; and one, by the cars in the mine. You will observe that 17 of these accidents were at the face of the workings, where the miner can see what is required for his safety and protection from accident; but casualty happens not to the inexperienced only, as the most careful and experienced miner will sometimes be caught, and at a time when he thinks he has used great caution.

"There were six accidents by the cars; the greater part of these were to runners, whose daily occupation was working with the cars, yet they run chances so that it may be lighter to them, although they do not always get off, as you have seen by the accidents to this class of labourers. There were three by explosions of gas; one of them was in a place where they had not seen any gas before that time; the place had also been examined by the fireman previous to the men going to work; he found all clear; but when David Morris went in to work, he kindled a small quantity of gas which had been collected in a hole. There was another of those accidents by gas, to a man working with a safety lamp, and you will have noticed how another person came in and kindled it with his naked light. All the other casualties were at places where it was necessary for repairs to be done, and which is in very dangerous places sometimes.

"In looking over the list of accidents, you will have observed that there is quite a number of them of a preventable character, and that with a little more caution on the workman's part, there would not have been such a long list; but while there are mines, and miners to work them, there will always be some one now and again getting disabled, as accidents will happen even to the most careful and skillful miners. But there is a class of men employed in the mines about here which I do not expect to know much about mining, although they may learn something about it, after being in some time, so that they can do light work. This class is the Chinese. You will have seen in the chapter of accidents that 12 of them are mentioned—two of them are fatal.

"As I have said in a previous report, it would be unjust to charge upon the proprietors or managers of mines responsibility for such accidents, when they have provided every appliance necessary for the safety of the workman, and every other thing necessary for the carrying on of a well-conducted colliery.

"Appended hereto are the Annual Colliery Returns.

"I have, &c.,

(Signed) "ARCHIBALD DICK,

"*Government Inspector of Mines, Nanaimo,*"

NANAIMO COLLIERIES.

Output of coal for 12 months ending December 31, 1883.	No. of tons sold for home consumption.	No. of tons sold for Exportation.	No. of tons on hand 1st January, 1883.	No. of tons unsold, including coal in stock, Jan. 1st, 1884.
35,665 3-20	16,371	19,631	105¼	442 2-20

Number of hands employed.			Wages per day.		
Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
293	97	8	$2 to $4	$1 to $1.50	$1.25 to $2.50

Total hands employed below ground .....269 Total hands employed above ground 129	Miners' earnings per day..... $2.50 to $5

Name of Seams or Pits—Chase River, South Field, and No. 1 Shaft.

Value of Plant—$150,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—Chase River, worked by slope; average 6 feet thick; South Field, adit 400 yards (about); seam somewhat unreliable; No. 1 Shaft, 630 feet; seam of coal, 7 to 11 feet thick; No. 2 Shaft, sinking.

Description and length of Tramway, Plant, &c.—Railway, 4 miles; 3 locomotives; powerful winding engines, steam-pumps, coal waggons, and extensive wharf.

M. BATE.

WELLINGTON COLLIERIES.

Output of coal for 12 months ending December, 31st 1883.	No. of tons sold for home consumption.	No. of tons sold for Exportation.	No. of Tons on hand 1st January, 1884.	No. of tons unsold, including coal in stock, Jan. 1st, 1883.
171,364 5-20	47,333	124,748 15-20	1,725 12-20	2,443 2-20

Number of hands employed.			Wages per day.		
Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
283	276	None.	$2 to $3.75	$1 to $1.25	None.

Total hands employed.....559	Miners' earnings per day..... $3 to $4

Name of Seams or Pits—Wellington.

Value of Plant—$250,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—6 to 10 feet thick; 2 shafts working; 1 not working; 1 slope working; 1 adit level working; 2 air shafts, one of these large furnace at bottom, the other ventilating fan, 30 feet diameter, driven by a pair of engines.

Description and length of Tramway, Plant, &c.—10 miles of railway; 6 locomotives; 197 waggons; 7 stationary engines working; 1 engine not working at present; 6 steam-pumps; 5 wharves for loading vessels, with bunkers, &c.

Pro R. DUNSMUIR & SONS,
CHRISTOPHER LOAT.

EAST WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31st, 1883.	No. of tons sold for home consumption.	No. of tons sold for Exportation.	No. of tons on hand 1st January, 1884.	No. of tons unsold, including coal in hand, Jan. 1st, 1883.
6,270	1,082	5,188	.....	.....

Number of hands employed.			Wages per month.		
Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
42	32	None.	$134.75	$40.50	None.

Total hands employed 74	Miners' earnings per month $81

Name of Seams or Pits—East Wellington.

Value of Plant—$10,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—1 shaft 8 by 18 feet, 240 feet deep; 1 seam; 2 slants, 6 by 12 feet; 2 levels, 6 by 10 feet.

Description and length of Tramway, Plant, &c.—3½ foot narrow gauge, 3½ miles in length; 2 locomotives; 20 coal cars.

GEORGE HAWXHURST.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1884

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing-Office, James Bay.
1885.

ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1884

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.
1885.

employed;

Average yearly earnings per man.
$ 173
403
506
034
517
482
849
813
893
814
992
749
569
734
671
567
043
1,222
783
820
077
607
518
551
548
404
396

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1884.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
			$ 48,672,128		

REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR 1884.

To His Honour CLEMENT FRANCIS CORNWALL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1884, is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary & Minister of Mines.

Provincial Secretary's Office,

23rd February, 1885.

REPORT.

GOLD.

The value of the Gold exported by the Banks at Victoria, during the year 1884, is as follows:—

Bank of British Columbia	$ 249,077
Bank of British North America	61,088
Garesche, Green, & Co	303,139
	$ 613,304

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, 25th November, 1884.

"*To the Hon. the Minister of Mines, Victoria:*

"SIR,—I have the honour, herewith, to transmit the mining statistics of the Cariboo District for the current year; and, for your further information, to submit the following report:—

"The accompanying statistics will be found to show a slight decline in the product of the mines the present year, as also a decrease in the number of white miners, with a corresponding increase in the number of Chinese.

"Although the gold yield has been quite large, yet the season has been one of disappointment to a majority of the white miners, fully three-fourths of the total amount having been produced by Chinese.

"But little prospecting for new mines has been undertaken. I have, consequently, little to say respecting 'explorations.' One party only received Government assistance in procuring their outfit, and that but to a limited extent. A copy of the report handed in by this party will be found herewith enclosed.

"I may state that the impression here very generally prevails, that the fund voted by Government for explorations would be much better applied if given upon certain prescribed conditions to assist some properly organized company to test the value of the deep ground on, say Slough Creek, or some other expensive but promising enterprise near the centre of the present gold-producing sections; while others would favour devoting the amount apportioned to this district towards inducing a thoroughly competent and reliable quartz miner, or expert, to spend a season examining our ledges, as it is thought, with the work now accomplished on many of the old ledges, and the discovery of new veins made within the past two or three years, a competent person would have no difficulty in soon forming a very decided opinion as to their value. As it is at present, whatever work is being done on ledges is little better than so much labour thrown away.

"Williams Creek has produced less the present than any season for the past twenty-four years. The fact is, the creek is about worked out, except, perhaps, the lower portion (which requires a different system of working from that at present in vogue to make it remunerative) and possibly a few of the hill claims which may continue to pay a fair return for a time longer.

A new hydraulic claim was opened on the hill side, between the Black Jack claim and Conklin Gulch, by Mr. Nason, which, I learn, promises well. With this exception, nothing new has been attempted on this creek the present season.

"The benches of Lower Antler Creek, now mined exclusively by Chinese, continue to yield fair returns. On the upper portion of the creek, the Yellow Lion Co.'s claim has paid very well for the amount of work accomplished. The difficulty of procuring a supply of water during the dry season of the year is a serious drawback to this company. The Nason Co., which has now the most complete and effective machinery on any mine in the district, is at the present time just starting work underground. The shareholders in this company have pushed ahead their extensive works during the season with vigour, and now believe that they will be successful in finally proving the value of their ground during the coming winter.

"The Waverly Hydraulic Co., of Grouse Creek, has made good progress during the season, and, judging from the appearance of the gravel in the 'face,' have at last reached ground that will pay; but, owing to a large cave late in the fall, they were unable to make a 'wash-up.' Little is to be said regarding Lightning Creek, or its tributaries. The Cypress claim, on Dunbar Flat (purchased last year by the Chinese), has paid exceedingly well, and is, perhaps, the only claim on the creek paying over fair wages. Legislation would appear to be required in view of the large extent of ground held on Lightning Creek by absentees, under a 'real estate' title, whereby the project of bringing up a bed-rock drain is completely blocked. It is definitely known that a very large extent of this ground, from the town of Stanley down, would yield handsome returns, were the same properly drained.

"On Slough Creek and Devil's Cañon, discoveries on the high benches, and in some instances well up the sides of the mountain, continue to be made. A large number of Chinese have worked here during the summer, in some instances taking out exceedingly good pay, A few whites have taken up claims which they will work by hydraulic pressure, where a supply of water can be secured. One company on Slough Creek is at present running a tunnel for a hill channel, which is thought to exist. I regret to say the company who, last season, applied for and obtained from the Government permission to lease a large extent of the deep ground on Slough Creek, has failed, so far, to effect an organization.

"Returns sent in from the Quesnellemouth Polling Division show a slight increase in the gold product of that division over last season.

"The closing of the Assay Office at Barkerville is felt to be a severe loss to the community. It not only occasions a direct loss to the miner in a depreciation in the value of his gold dust, but will have a tendency to discourage quartz prospecting, as it leaves us without the means of testing the value of any minerals which may be found. The office having become so nearly self-sustaining, it is hoped that the Government will succeed in finding a properly qualified assayer, and cause the office to be again opened.

"The following is an approximate estimate of the gold yield of the district for the year 1884, exclusive of Omineca:—

Barkerville Polling Division	$153,600
Lightning Creek "	78,000
Quesnellemouth "	77,660
Keithley Creek "	89,595
Estimated yield from date to 31st December	25,000
	$423,855

"But little has been done in the way of developing our quartz mining industry during the season. The Burns Mountain Quartz Mining Co. (limited) indeed pushed ahead their tunnel to a point where it was expected the ledge would be found, but, failing to strike which, the work was suddenly stopped for some time. They have, however, just resumed operations, and will continue the tunnel some distance further.

"The Dominion Quartz Ledge Co., whose mine is situated some 30 miles south of Barkerville (referred to in my report of last year) sent out prospectors during the summer, who succeeded in sinking on the ledge 12 feet, and cross-cutting it at that depth. They brought in some of the rock, which it is proposed to send to San Francisco for a test.

"It is reported that the Messrs. Girod, late of Quesnelle, now in France, have succeeded in bonding the Sadoux quartz mine near Mosquito Creek, to a company of French capitalists, and that work will be shortly commenced on the mine.

"In view of the early completion of the Canadian Pacific Railroad, many old Caribooites continue to leave the district, with the object of making themselves homes somewhere along the line of railway, while but few new comers appear to take their place in the mines. This state of affairs may be expected to continue until the completion of the railroad, when a reaction will probably take place. So far, the construction and maintenance of the railroad has been most injurious to the interests of this district, as, while the works of construction have attracted away a large number of our most enterprising miners and prospectors, the maintenance of that portion of the line over which the cars now run has actually, owing to the exorbitant tariff, increased the prices of all kinds of supplies in Cariboo. This fact will be better understood when it is known that before any railroad works were commenced a sufficient number of ox-teams and pack-trains were employed on the road between Yale and Cariboo to meet all requirements. But, anticipating a fall in the rates for freight, many of the carriers disposed of their stock till, at the present time, the carrying trade is in the hands of a few, who naturally make all they can out of the situation; while merchants, anticipating a fall in the freight rates on the completion of the railroad to Spence's Bridge, withheld their orders till late. Even with the scarcity of teams on the Cariboo road, I am informed that some of those actually go to Yale for their loads, travelling from Spence's Bridge to Yale and back, a distance of 160 miles, loaded one way only, and are able successfully to compete with the railway company's charges.

"I have ventured to say this much to show that if the district appears to be on the decline, there are other than local causes affecting its prosperity, as, to my knowledge, quite a number of persons are leaving the district owing to the unusually high prices of provisions. I am informed by merchants here that the lowest freight rate from Victoria to Barkerville this fall has been 12½ cents per pound. It may, therefore, be inferred with what anxiety Cariboo looks forward to the early completion of the Canadian Pacific Railway; a consummation which, it is hoped, will bring about a different state of affairs.

"Crops with the farmers in the lower part of the district have been exceedingly good. The wheat crop especially exceeds in quantity the production of any former year, notwithstanding which flour, at the present time, is selling at Soda Creek for 6½ cents per pound, and at Barkerville for 12 cents. The mildness of the climate thus far this fall is unprecedented. There is not sufficient snow at Barkerville at the present writing to make good sleighing, and below Stanley waggoning is still good.

"The following is the retail price, in Barkerville, of some of the principal articles of consumption:—

"Flour, 12c. ℔; Butter, 62½c.; Beef, 10c. to 15c.; Mutton, 18c.; Hams and Bacon, none in market; Dried Apples, 40c.; Peaches, 50c.; Rice, 20c.; Potatoes, Turnips, Beets, Cabbage, and Carrots, 4 to 5c.; Onions, 18 to 25c.; Tea, $1 to $1.25; Coffee, ground, 75c., green, 55c.; Raisins, 40c.; Coal Oil, $19 per case; Candles, 40c. by the box; Eggs, $1.25 per doz.; Gum Boots, $10 per pair: Giant Powder, $1.50 to $1.75 ℔; Wheat, 8c.; Oats, 6c.; Timothy Hay, 3c.; Wild Hay, 2c. ℔.

"It is fondly hoped that these figures will be materially reduced upon the advent of good sleighing.

"I have, &c.,

(Signed) "JNO. BOWRON,
"*Gold Commissioner.*"

REPORT OF MESSRS. LANYON AND D'ORPENTIGNY.

"Left Barkerville on the second of September, 1884, for the purpose of prospecting in the neighbourhood of the Mustang Valley, below Mustang Creek; arrived the following day, and prospected several small gulches for twelve days; found a little gold, but not in sufficient quantities to pay, and concluded to go down the valley to Willow River; tried several creeks on the road, but found nothing. After striking Willow River, travelled down stream until we struck Valley River, emptying into the Willow. About six miles below Mustang Valley, prospected on three creeks and found a little gold on the first creek after leaving the Mustang Valley; made a small ground-sluice and could find a little gold to every pan; started a shaft; got down ten feet, but not having proper tools, and striking large boulders, we could not go any deeper; could find a little gold in the bottom, but, not being able to find the bed-rock,

could not say whether it would pay or not, but think it was the most favourable looking creek we saw on the trip. After spending four days, we started to return, by way of Valley River. Tried several creeks but found no gold, and arrived back at Sugar Creek, after being nine days on the trip. Still having some provisions left, we started to prospect at the head of Sugar Creek, going west toward Willow River, but found the snow too deep, there being from two to three feet. Had to turn back and come to Hardscrabble Creek, and prospected the left fork. Found the bed-rock shallow at the head of the creek, and found a little gold. Came some distance down the creek, and found a little gold on the clay; sunk a shaft twenty feet from the clay; found very little gravel on the bottom and scarcely any gold on the bed-rock. Our provisions being then exhausted, we returned to Barkerville, after an absence of eight weeks.

(Signed) "JOHN LANYON,
" "OLIVER D'ORPENTIGNY.

"*To John Bowron, Esq.,*
"*Gold Commissioner.*"

MR. STEPHENSON'S REPORT.

"FORKS OF QUESNELLE, B. C.,
"26th November, 1884.

"*To the Hon. the Minister of Mines.*

"SIR,—I have the honour to forward herewith the mining statistics of Keithley Division, Cariboo District, for 1884. Of the estimated yield of gold, there is a falling off from last year, which is chiefly owing to the decrease in the number of white miners, as many have left the mines and gone down country to find employment on the railroad.

"The season all through has been favourable for mining in this section, and I am well satisfied the Chinese have done better this season than last, although they will not admit it; but the truth is something I do not expect from a Chinaman, except by accident. Although there has not been any new diggings found, the Chinese seem to be more scattered over this section than for several years past, while their numbers are about the same; and wherever you find a Chinaman that has worked a few days in a place, it is a sure thing he is making some money.

"On the Horsefly River, where the Chinese thought they had found good pay last fall, it proved to be a failure, and consequently there has been very little done in the Horsefly section, only one company working through the season.

"In conclusion, I may add that the outlook, though not bright, is not worse than it was a year ago; in fact, the Chinese traders must think it better, as their shipment of goods has been much heavier this fall than last.

"I have, &c.,
(Signed) "W. STEPHENSON,
"*Government Agent.*"

CASSIAR.

MR. CRIMP'S REPORT.

"LAKETON, CASSIAR,
"13th October, 1884.

"*To the Hon. the Minister of Mines.*

"SIR,—I have the honour herewith to forward the Mining Statistics for 1884, as well as my report upon the district.

"Dease, Thibert, and McDame Creeks are all about worked out—that is the bed of the streams. The past summer a great many have been working over the bed of the streams the second and third time.

"On Dease Creek there have been about ten white men and fifteen Chinamen, and the result of their labours has been about $10,000, as near as I can find out, and I think the estimate is pretty accurate.

"On Thibert Creek there were twenty-two white miners and twenty-four Chinese miners, and the amount taken out was $30,000. This creek has a few fairly good hill claims, but they are getting pretty well worked out.

"On McDame Creek and its tributaries the same may be said as of the before mentioned creeks; the amount for the year past ..... $ 53,600

Dease Creek	10,000
Thibert Creek	30,000
Defot Creek	3,000
Desultory mining	5,000
Total	$ 101,600

"I think the above amounts are pretty accurate as far as I have been able to ascertain.

"There has not been any discoveries made the past season. There were seven white men and four Chinamen down the Liard River the past summer, but did not find anything that would pay wages.

"There were about 180 miners in the district during the season—about equally divided—half white miners, and the other half Chinese; and it is fully expected that there will be about the same number next year. Of these, about 33 white men and 40 Chinamen will winter in the mines.

"The health of the miners during the past season has been generally very good; only one death, and that was by the drowning of the late A. F. Black.

"Law and order have been generally good in this district the past season.

"The market is well supplied with everything that the miner wants; vegetables are abundant, at reasonable prices.

"The crops have been good the past summer in the farming district, partly owing to the plentiful rainfall, the crop of hay was abundant.

* * * * * * * *

"I have, &c.,
(Signed) "J. L. CRIMP,
"*Gold Commissioner, &c.*

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE,
"Clinton, 12th Dec., 1884.

"*The Hon. John Robson, Minister of Mines, Victoria*:—

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the district of Lillooet for 1884.

"The total ascertained yield of gold for the district this year is $107,934, a very noticeable and gratifying increase over former years.

"The figures given are from perfectly reliable and trustworthy sources. Seven-eighths of the amount named has been bought by Mr. Smith, Lillooet, and Messrs. Foster & Bell, Clinton. I make no estimate of the amount carried out of the district by Chinese and others. This amount is undoubtedly large, but no reliable account can be had of it. For comparison, I give the ascertained yield of the district for the past four years, viz.:—

1881	$ 63,915
1882	54,295
1883	68,342
1884	107,934

A very large amount of this year's increase must be credited to Bridge River and its tributaries, and I have much pleasure in reporting that nearly the whole of the miners in that locality are white men, and have every reason to believe that the majority of them are well satisfied with their season's work, and nearly all intend returning there next spring.

"I have no new discoveries of gold to report in this district for the past year. A party of three prospectors, aided by Government, were out for three months in the eastern part of the district. Unfortunately, they kept too far to the north, having reached a point within a short distance of the head waters of Canoe River, a tributary of the Columbia. This expedition was entirely without results in the discovery of gold or other minerals.

"In minerals other than gold, I have to report the discovery and location of a mica ledge at a high altitude on Clearwater River, a tributary of the North Thompson. A specimen (11 inches by 8 inches) of the mica in my office, taken from the exposed surface of the ledge, shows a large number of fractures, the result, I presume, of ages of alternate freezing and thawing. Should the mineral prove to be without fracture at a depth below the action of frost, it will undoubtedly be a most valuable addition to the resources of this Province. Mr. James McKinlay, of Lac La Hache, is the locator, and is most deserving of success, having spent two seasons, unaided, prospecting between Lac La Hache and the foothills of the Selkirks, a portion of this district in which there is ample room for others.

"Mr. McKinlay has brought in a number of specimens of quartz, &c., samples of which I forward to your department by this express. He informs me that he has sent samples for assay and analysis to different places, a few weeks ago.

"Considering the comparative few engaged in mining industries, this district may be congratulated on the result of the season's work. At the same time I must express my regret that enterprise and capital still hold aloof from adding to the general welfare of the Province at large, by opening out and developing the known auriferous benches on both sides of Fraser River in this district.

"The same remark applies to the claims on the Big Slide lode, on which nothing has been done this year.

"I have, &c.,
(Signed) "F. SOUES,
"*Gold Commissioner, Lillooet District.*"

YALE AND LYTTON.

MR. HUSSEY'S REPORT.

"LYTTON, 29th November, 1884.

"*To the Honourable the Minister of Mines, Victoria:—*

"SIR,—I have the honour to enclose the mining statistics for the Hope, Yale and Lytton Divisions of the Yale District for the year 1884.

"In the Hope Division the silver mines which attracted so much attention some time back seem to have gone out of thought, simply from the want of energy and capital to work ground which has been shown to contain an almost inexhaustible supply of the precious metal.

"Gold mining operations in the Yale Division are not so extensive as they should be, considering what energy, perseverance and capital might accomplish. At present they are principally confined to Chinese rocking on the bars of the Fraser River. A few may be said to be making wages, whilst the remainder are only making a bare subsistence. It is impossible to arrive at even an approximate estimate of the yield of gold in this division. There are several recorded claims on the flat opposite the town of Yale, but no workings are carried on at the present time.

"Mining in the Lytton Division is confined to Chinese and Indians working on the Fraser and Thompson Rivers, the majority of whom secure but a scanty remuneration for their labour. There are only a few recorded claims in this division. From reliable sources I have received information that the amount of gold exchanged at Lytton is about $12,000. It is not possible to obtain a correct estimate of the total yield, as some is carried away or remains in private hands.

"It is safe to add $3,000 to the above, making the total amount $15,000.

"I have, &c.,
(Signed) "FREDERICK HUSSEY,
"*Government Agent.*"

KAMLOOPS.

MR. TUNSTALL'S REPORT.

"KAMLOOPS, January 7th, 1885.

"*To the Hon. John Robson, Minister of Mines, Victoria:*

"SIR,—I have the honour to state that, in consequence of the Chinaman who formerly supplied me with information, being absent from this place, I have been unable to furnish the mining statistics of the Kamloops District for the year 1884.

"I regret to say that the efforts of the Government prospecting party, which left here last fall to find gold in paying quantities have proved unsuccessful. I herewith enclose Mr. Ratchford's report.

"I have, &c.,
(Signed) "G. C. TUNSTALL,
"*Government Agent.*"

MR. RATCHFORD'S REPORT.

"KAMLOOPS, January 8th, 1885.

"*To Geo. Tunstall, Esq.:*

"DEAR SIR,—We left Kamloops on the 21st of September, 1883, and arrived at Kirby's Landing, Columbia River, on the 28th September. Cached a part of our provisions and proceeded up the river; found gold everywhere, but not in paying quantities; saw where there had been a good deal of prospecting done. On the 7th of October came back to cache, and during the winter explored the surrounding country with very little results. We are of opinion that placer mining in that section is very limited, there may be ledges. The country we passed through between the Eagle Pass and Goldstream, being anything but favorable. Left the Columbia on the 4th of March and arrived at Kamloops on the 15th.

"I remain, &c.,
(Signed) "JAS. RATCHFORD."

KOOTENAY.

MR. VOWELL'S REPORT.

"KOOTENAY, B.C., 23rd December, 1884.

"*To the Hon. John Robson, Minister of Mines, Victoria:*

"SIR,—I have the honour to enclose herewith the "mining statistics" for the present year, together with my report upon the mining industries of the district.

"The following returns are the result of much careful enquiry, and are as correct as it is possible to have them, owing to the many difficulties in the way of obtaining accurate information.

Wild Horse Creek	$36,730 00
Bull-Moyea Rivers	17,232 00
Lesser Creeks and Bars	6,864 00
Total	$60,826 00

"As compared with past years the returns from the placer mines are satisfactory, but I must point out that the mining interests of this district in the future, will depend almost entirely upon the development of the promising quartz mines which are now being opened. At and since the time when placer mines were first discovered at Wild Horse Creek, and in the Big Bend country (some 20 years ago), miners have been prospecting for that class of diggings along the Columbia River, upon its tributaries, and throughout the Selkirk range of mountains, with no very favourable results.

"It is true that in the early days many difficulties existed which are now being gradually removed by the advance of settlement, encouraged by the construction of the Canadian Pacific Railroad through the Province.

"Deeming the country to have been only partially prospected, miners have gone out in different directions this year searching for shallow or placer mines, but I regret that in no instance has any marked success attended their efforts.

"The season, however, has not been favorable in consequence of the heavy and constant rains which have prevailed throughout the summer, the water in the different rivers and creeks being continuously at a high stage which prevented the effectual prospecting of their beds.

"The quartz developments in the vicinity of Kootenay Lake are full of promise, it being no exaggeration to state that mountains of ore have been discovered. Mineral claims have been located upon the west side of the lake this year which far exceed in richness anything hitherto discovered in that section.

"Forty-nine (49) mineral claims have been taken up in that locality, and a large company has been organized for the purpose of bringing in machinery and commencing active operations upon several of the mineral claims next spring. A waggon road is under construction from Sand Point, a station on the North Pacific Railroad, to Bonner's Ferry, on the Kootenay River, a distance of some 40 miles. The company also intend to place a steamer upon the Kootenay River, to complete the line of transport from the North Pacific Railroad to the Kootenay Lake mines.

"Many old Californians, familiar with Leadville and other valuable quartz mines of notoriety, who have visited Kootenay Lake during the past season, have predicted for those mines a brilliant future. There will be about 100 men actually engaged in quartz mining at Kootenay Lake next season, besides a great many miners prospecting, and I would recommend that an officer be provided for that place as well as a record office and lock-up. In future it is also expected that many miners will winter there, as once the mines are properly opened, work, to a great extent, can be advantageously carried on throughout the year. I would here mention that the officer to be there stationed will require to be one of some experience and judgment, as otherwise complications of a serious nature are certain to arise owing to the valuable interests there centred, etc. Several mineral claims have been taken up during last fall on Wild Horse Creek, but as no assays have as yet been heard of, it is impossible to pronounce upon their respective value. About 100 men, whites and Chinese, will winter at the last named place.

"In the Kicking Horse region 135 mineral claims have been located in different directions, viz.: in the vicinity of the summit at Kicking Horse, the First Crossing of the Columbia River, Quartz Creek, Beaver River, the Ille-cille-waet, and the Spallumcheen River, the latter empties into the Columbia River about 30 miles above the mouth of Kicking Horse.

"The mineral rock discovered gives evidence in many claims of gold, the majority being galena. No developments, however, have as yet been made of a character to enable me to furnish any definite information regarding their value, etc.

"Upon the Spallumcheen River, where locations extend for over four miles, considerable work has been done upon several of the claims. The ore, a free milling, low grade, galena, is abundant, giving returns from various assays of from $12 to $64 in silver, to the ton, The ore improves in quality as the work advances and gives evidence of gold, copper, antimony, etc.

"Feeling it my duty to do so, I would again call the attention of the Government to the great and pressing necessity that exists for the establishment of an assay office in this district. It has been frequently represented to me that the cost of shipping ore and having assays taken at a distant place is not only expensive, but unsatisfactory in every respect, as in most cases the returns so obtained cannot be relied on. I feel certain that in a pecuniary point of view, the assay office would be self-sustaining, the rapid increase in quartz mining expected throughout the district cannot but lead to such a conclusion.

"It is estimated that about 15 men will winter at Golden City, 150 at First Crossing of Columbia River, and at the Beaver some 250 traders and others. There will be from 1,500 to 2,000 men along the line of the C. P. R. getting out timbers, etc. The misunderstanding existing between the Dominion and the Provincial Governments, relative to the precious metals lying within the railway belt in this district, has militated very much against the progress of mining, etc., in Kootenay this year, and it is hoped that with the advent of the coming season, 1885, all such distracting complications may be removed.

"I have, &c.,
(Signed) "A. W. VOWELL,
"G. C. & S. M."

COAL.

The following table shows the output of each year from 1874 to 1884, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.,
"4th February, 1885.

"*To the Honourable John Robson,*
"*Minister of Mines.*

"SIR,—I have the honour to respectfully submit my Annual Report up to the 31st December, 1884, as required of me, as Inspector of Mines, by the 'Coal Mines Regulation Act, 1877.'

"During the year 1884, the following collieries have been in operation, viz.:—

"Nanaimo Colliery, belonging to the 'Vancouver Coal Mining and Land Company (Limited)'.

"Wellington Colliery, the property of Messrs. Robert Dunsmuir & Sons.

"East Wellington Colliery, owned by R. Chandler, Esq.

"The Alexandra Colliery, belonging to the 'Esquimalt and Nanaimo Railway Company.

"The aggregate output of coal in the year 1884, from the collieries, amounted to 394,070 tons, which, with 1,830 tons in stock on 1st January, 1884, made a total of 395,900 tons of coal available for export and home consumption.

"The coal exported during 1884 amounted to 306,478 tons, of which the principal part (see statement of California importations below) was shipped to San Francisco and southern ports in California; various shipments were also made to Portland, Oregon; Washington Territory, to Alaska, the Hawaiian Islands, and China; and supplies were furnished to steamships and vessels calling.

"The local consumption of coal in 1884 was 87,388 tons.

"In my last report I gave a comparative table of exports and local consumption of coal from 1878 to 1883 inclusive, on reference to which it will be seen that the exports of 1884 have more than doubled in amount over those of 1883, while the local consumption for 1884 is upwards of 20,000 tons more than that of the previous year.

"On the last occasion of my addressing you I had to account for a decrease in the output and exports of 1883 as compared with those of 1882; this year, however, I have the pleasure of pointing to the remarkable and very gratifying increase of upwards of 180,000 tons in the output, and of 156,911 tons increase in the exports of 1884 above the output and exports respectively of 1883. I need hardly remind you that this increased production of our mineral resources has added, in a relative degree, to the wealth and prosperity of the Province at large.

"The following statement, which is authenticated by an accepted commercial authority, will show the important position which British Columbia has attained as a coal producing Province, in San Francisco, the chief market, at the present time available for our coal, and will also indicate the various other sources from which San Francisco and Wilmington in California have drawn their supplies of coal during the year 1884, viz.:—

	1883.	1884.
British Columbia	128,503 tons	291,546 tons.
Australia	174,143 "	190,497 "
England and Wales	131,355 "	108,808 "
Scotland	21,942 "	21,143 "
Eastern States	43,861 "	38,124 "
Seattle	139,600 "	125,000 "
Carbon Hill	140,135 "	122,060 "
Mount Diablo	76,162 "	77,485 "
Renton, Newport, South Prairie	43,600 "	60,413 "
	899,301 "	1,035,076 "

"The commercial authority from which I have quoted, also remarks upon the prospects in the California coal market, in very encouraging terms, as follows:—'Our' (California) 'increased consumption of coal gives very strong evidence of the multiplying of our manufac-'tories and their further enlargement in 1885, and if, as is anticipated, there should be a 'reduction in the duties on coal and pig iron, there would be a marked impetus to their 'success;' and therefore may I add a corresponding increase in the demand for coal.

"There is, therefore, likely to be a good market for the first-class coal produced by our mines for many years to come, in San Francisco; and it only remains for our colliery proprietors, and their able representatives, to maintain their hold of, and enlarge their sales in, that market; and there is little doubt that they will do both, as their keenness and energy in business has been well proved. Besides which there is ample room for expansion of our coal trade with the Hawaiian Islands, Portland, O., and Central American ports; there is also a demand for railway purposes looming up in the near future in this Province.

"NANAIMO COLLIERY.

"DOUGLAS PIT.

"In this mine—which is owned by the Vancouver Coal Mining and Land Company, Limited—there has been no mining done during the past year; but they have continued to pump the water, keeping the mine nearly dry.

"NEW DOUGLAS (OR CHASE RIVER) MINE.

"This mine—also owned by the Vancouver Coal Company—is worked by slope, extending about 500 yards from the entrance, to what is known as No 4 level. At a distance (northerly) of about 400 yards in this level, is the head of the 'slant,' which is driven across the pitch—the coal being too steep here to go down straight to the dip—the slant is driven about 500 yards down, taking as much down grade as they had power to work with. At the slant head there is a steam winding engine, by which the coal is drawn up the slant; steam is brought from the surface.

"The workings in this mine are at present entirely situated in the district of the slant and its levels, in which, so far as they have gone down, the coal is very hard, of good quality, and from four to seven feet thick.

"The coal has been worked on the pillar and stall system, the pillars of coal being taken out after the stalls have been worked to their destination, leaving those pillars which protect the main road and airways to be taken out at some future time.

"Ventilation is good. The last time I was down in this mine, in December, there was in circulation, near to the face of the workings, about 300 cubic feet of air per minute to each person.

"In this mine, the Vancouver Coal Company were at one time very much troubled with water; but now they are about masters of that difficulty, as they have got good and powerful pumping machinery, both in the slope and in the slant. The manager is now satisfied that, even in the wet season, if no accident or derangement happens to the pumping gear, it is not likely that there will be any stoppage to the working caused by water.

"Considering the troubles they have had in this mine, one way and another, in the past, the mine is kept safe for the workmen. There is always plenty of timber and any other thing that may be required for the use of the miner.

"A 12-inch plunger pump in the slope is operated by massive wooden rods and pumping gear attached to the slope head engine at the surface; but the steam for working the large spare pump in the slope, and the several other pumps in the level and the slant, is taken down into the mine from the surface, the pipes passing along the side of the travelling road, which is sometimes made very warm.

"SOUTH FIELD MINE.

"This mine, of the Vancouver Coal Company, is about four miles south of Nanaimo, upon that part of the Company's Nanaimo estate which is designated as the South Coal Field. The mine is entered by what is called the Adit, which keeps in an easterly direction, and a little way in slopes somewhat, until, at a distance of about 300 yards, a slope is driven off the Adit in a northerly course for about 500 yards. The last time I was down, the coal was six feet thick at the face, good and hard, but it has not been so all the way; sometimes it got soft, and at other times it would almost pinch out. In some places the coal is twelve feet thick. The coal, when clean, is very hard and of good quality. In certain parts there is solid conglomerate rock overlying the coal, and at other places a thick bed of shale, full of slips, which makes it very dangerous.

"This mine is ventilated by a large furnace at the bottom of the upcast shaft. Ventilation is good, and on the separate split system, and at my last inspection there was about 340 cubic feet of air per minute for every person in the mine. There is little or no gas, and, considering the depth, there is very little water to contend with.

"There has been much ground gone past which will not pay to work, and, in addition, they went over a down fault, since which the coal looks much better and more regular. Having a series of bores ahead of the slope, proving the coal to be thick, there is good prospect of this mine being a valuable property.

"About 300 yards in a northerly direction, the Vancouver Coal Company have opened another mine, known as—

"NEW SLOPE, SOUTH FIELD.

"This mine is entered by a slope. The company have incurred great outlay in opening this mine and erecting slope head works, with a pair of powerful steam winding engines to provide for the output of a large quantity of coal per day; also in extending their railway from New Douglas Mine—bridging Chase River—up to this mine, with continuation to the South Field Mine, forming altogether a first class railway of steel rails, flange section and fished, gauge 4ft. 8½in., of about 6 miles in length, from the company's coal loading wharfs at Nanaimo.

"Starting at the surface, and in the direction (northerly) of a bore which had been previously put down there, the company drifted down through clay and gravel to get where the outcrop of coal is supposed to be; they succeeded in finding the coal, which was not very hard at first, but as they drove into it the coal got harder, and for the last 150 yards of the "New Slope" the coal is good and hard.

"Ventilation is good, although at present the motive power and airway are only temporary. The company have put down an air shaft between the "adit" of South Field Mine and this "New Slope," and they are now driving an airway to the air shaft, which will soon, almost immediately, be connected with the shaft, when extensive mining can be carried on in this mine.

"This has the appearance of being a good mine, and is being worked towards the bores which I have previously referred to.

NO. 1 SHAFT, ESPLANADE, NANAIMO.

"This shaft of the Nanaimo Coal Company, is the shaft which I have mentioned in a previous report as having got to the coal. I have now to introduce the No. 2 Shaft, which I reported as being then down 480 feet. Sinking was steadily kept on until 17th February, when the coal was struck at a depth of 614 feet from the surface, the coal proving itself to be 7ft. 6in. thick and of good quality. At the same time they were drifting from No. 1 Shaft for a connection with No. 2 which was made on the 23rd February. Since that time the two

places are known as the "No. 1 Shaft." The No. 1 being the intake and hoisting shaft, and the No. 2 the up-cast or air shaft.

"Everything about the No. 1 Shaft is executed in a good and workmanlike manner. The pit bank and head gear seem to be of the best kind, and as strong and substantial as massive timber, bolts and iron work can make them. The pit head is all housed and covered. There are two cages working in this shaft, they are what are called double deckers, to hold two coal cars on each deck or storey of the cage, so that four cars can be hoisted on each cage at one time. There are wire rope conductors in this shaft to guide the cages up and down, which are made fast at the top to the pit frame, the other ends being held in their respective places at the bottom of the shaft by large cast iron weights.

"From the bottom of No. 1 Shaft levels run north and south. The No. 1 south level had very good coal, about 10 feet thick, but when it got in about 100 yards it gradually got thinner, until top and bottom came almost to each other. They drifted into it for some distance, when the level was stopped for the present. In No. 1 north level the coal kept good for quite a distance when it got thin and soft, until the level got in about 400 yards, when it improved. the coal soon reached 7 feet in thickness, hard, and of good quality, and continues to keep so. About 30 yards from No. 1 Shaft bottom along No. 1 north level there is a slope, at the head of which the company have made an engine room, having heavy foundations of squared timber (cedar), and sawn balks 18in. x 18in., upon which will be laid a fine pair of 16in. cyl. winding engines, which will replace the present engine in hoisting coal up the slope, which is driven down a gentle grade for a distance of about 500 yards in an easterly direction. From this slope two levels, No. 2 north and No. 2 south, are driven.

"No. 2 north level has been driven through ground of the same kind as No. 1 north passed, and now the company have got in No. 2 north level the same good hard coal as I have mentioned as being in No. 1 north, and of equal thickness—7 feet.

"The No. 2 south level, for the first 200 yards from the slope, had very good coal, varying in thickness from 5 to 10 feet; but the fault met with in No. 1 south was struck and is now being driven through.

"The above mentioned slope goes out direct under the estuary of Nanaimo harbour for about 500 yards, and at the face the slope is of a vertical depth of 750 feet below tide water, with all the rock gone through in the shaft intervening. The workings are almost dry; but what little water is made is free from salt.

"Ventilation is good. When I was down in December there were 511 cubic feet of air per minute for each person. This mine is ventilated on the separate split system. Air being good they are not much troubled with gas.

"Coal is hoisted from No. 1 shaft by a pair of very powerful engines of 30-inch cylinders with 5 feet stroke, and winding drums of 14 feet in diameter, capable of raising 1,000 tons per shift of 8 hours. In hoisting and lowering workmen every regard is had for their safety. There is at this shaft a good supply of prop wood and everything required by the miners.

"No 1 shaft is connected with the company's coal loading wharves by a well constructed railway of steel rails of the same weight and gauge as the other railways belonging to the company.

"ALEXANDRIA COLLIERY.

"This is a new work being started in Cranberry District by the Esquimalt and Nanaimo Railway Company. Besides the mineral owned by them in the railway belt, the company have purchased the mineral rights from some of the settlers. And now they are prospecting in that property for coal. They have found the outcrop in three or four places. There is one shaft down about 50 feet to the coal; there is also a slope into the coal about 70 yards. At the start the coal was soft and not regular, but now the coal is good and hard, and six feet thick, in two layers with dirt between them. The coal is improving as they go into it and the dirt getting thinner.

"This work is about one mile south of the Vancouver Coal Company's South Field Mine, and close on the side of the line for the Esquimalt and Nanaimo Railway, and I think this mine will give a good account of itself before the year 1885 shall have come to a close.

"WELLINGTON COLLIERY.

"WELLINGTON MINE.

"This is the slope mentioned in previous reports as being down 1,100 yards. Messrs. R. Dunsmuir & Sons, the proprietors of Wellington Colliery, have worked this mine regularly during most of the year. On the west side of the slope the mining is at present confined to the pillars (of coal), but there is more coal in the pillars than was taken out by the working of the stalls. On the east side, in No. 10 level, there are a few places working, besides which, work is being done at the pillars here also. Those works are well spread over the mine. The Wellington Mine will continue to send out a large amount of coal for a long time to come, and as the coal was good that has been taken out, the same quality may be expected from the pillars. There are four shafts or outlets from this mine, and in case of an accident they can be used at any time.

"Ventilation is good, the motive power being a large furnace. The air is conducted on the separate split system, with the main divisions to each side of the slope. The last time I examined it there were 300 cubic feet of air per minute to each person; this is conducted well into the face of the stalls and pillars. There is very little gas to be found in this mine, but the fireman, as a proof that he has been examining the works, puts the number or day of the month on the face of the coal where he made his last examination, no person being allowed to go past the fireman's station until such examination is made and reported to each individual miner. I should mention that the same method is also practiced in all the coal mines of this Province, by their respective firemen.

"In connection with the Wellington Mine there is what is known as the Adit Level, going out level free to the valley of the Millstone River. In this place there has not been any stoppage during the year. The proprietors are taking out the coal which is above this level, and there is a considerable area of coal which may be got from this place, as it can be worked out to the outcrop, not fearing if some water should come in. No machinery is required to pump the water, as it runs out itself. The coal here is hard and of a good quality. Ventilation is good. This place is ventilated in connection with that part of the mine I have previously mentioned, and I may say that this place is clear of gas, as it is seldom or hardly ever found.

"No. 3 PIT, WELLINGTON COLLIERY.

"This is the only working shaft that Messrs. Dunsmuir & Sons have in the valley. It is 200 feet deep. Nearly all the mining has been to the dip. About 75 yards in a southerly direction from the bottom there is a slope, which is down 750 yards into what is known as the basin of the Wellington Coal Field. There is a gentle grade all the way, but gradually getting flatter until it becomes level, and from here the coal gradually rises all around. The working is very dry, with the coal coming in on every side. Before getting to the bottom of this slope there are three levels, two on the south and one working on the north side; the latter is No. 4 level. This mine, as are all the mines of Messrs. R. Dunsmuir & Sons, is worked on the pillar and stall system. As the works here are under the Millstone Valley, and 400 feet from the surface, they are leaving large pillars about 20 yards one way, with cross cuts put through to the adjoining stalls, so that, at present, fully one-half of the coal is left to support the roof, until such time as the stalls have got through to their destination, or, when there is no further use for them, to be taken out. Great care has been taken here to prevent accident, either from an inflow of water, gas, or otherwise. Ventilation here is very good, and it is scarcely possible for a mine to be in a better position to be ventilated, the return being a shaft about 20 yards from the down-cast, the motive power being a fan of 30 feet diameter and 10 feet wide, worked by a pair of engines, one at each end of the fan shaft, either of which engines is capable of working the fan to whatever speed may be wanted. Besides this fan, the engines at the top of the slope (underground) exhaust into the return, and as the mine is dry a jet of water is running in the down-cast, so that the air is not so dry as it would otherwise be; and, while helping the ventilation, it also causes the mine not to be so dust-dry as it was before the adoption of this method. Air coming down the shaft has 75 yards to get along the level; then it gets the slope in a direct line for 750 yards. This is the farthest place from the two shafts. Now the air passes on its way along the faces, coming on a rise all the way. The most of the air is taken to the faces; what escapes takes the old works, and when coming to No. 4 level it is all caught up again. The area of the slope there is little of it less than 90

feet. I have often tested the current of air, and never found less than from 500 to 600 cubic feet per minute of air for each person working in the mine, with the fan making 23 revolutions per minute, having seen this fan making nearly double this number, as it is doing at present. Ventilation machinery here is capable of keeping in motion 1,000 feet per minute for every man employed in the mine. This mine gives off a considerable quantity of gas, but it does not give much trouble. This is the mine where that terrible explosion occurred on the 30th June; but since that time it has been very free from gas, so that with ordinary care on the part of all parties connected with this mine, this place should be free from accidents by explosion of gas, as the manager spares no expense to have the mine safe.

"No. 4 PIT, WELLINGTON COLLIERY.

"You will see by a former report that this is a shaft on the bluff overlooking the Millstone Valley. In this shaft there has been very little time lost with the mining operations during the past year. The coal continues to keep hard and good and from 6 to 12 feet thick. There have been some few drawbacks with faults, but, with all that, this is a valuable mine. In last report I mentioned that Messrs. Dunsmuir & Sons were pushing a slope from this place towards their No. 3 pit. They succeeded in making the connection in the early part of February. Then they could employ all the men they could accommodate. The workings of this pit go out from the north and south sides of the shaft, two levels from each side. From these levels mining is carried on extensively. Ventilation was good, the motive power being a fan and steam jet, down-cast and return, the shaft being partitioned off. This mine is also ventilated on the separate split system, the first division being at the shaft, the intake being the north and south levels, returning by way of the stalls, and being carefully conducted to the faces by brattice, thence taking a rock tunnel to the upcast shaft. The last time I tested the air here I found 57,600 cubic feet of air per minute in circulation, or 500 feet for each person.

"On the 30th December there was a fire discovered in this mine, but how it originated cannot be found out. William Drew, an engine driver, while attending an engine down in the mine, fixed about 30 yards in from the shaft on the side of the north level—there being a door a few feet behind the engine, as a way into the return airway—heard a sound as if it were some one coming down that way. He took no notice of it for some time, when, the door being a sliding one, he pulled it open, and then he found that what he had thought to be the noise made by a person in the airway was a fire, roaring like a furnace. As the steam came from the surface for the engine, and there was no water at hand, he closed the door as well as he could, but not close, ran to the shaft and gave the alarm; and afterwards he ran past the fire, being acquainted with the works, then went to one section of the mine, told all the men, and afterwards went to another section, notifying the men to make haste and come out, as the mine was on fire. This was about five o'clock in the afternoon, and all the men were supposed to have been got out; but it appears that about the first man that Drew told is missing, as well as a Chinaman who worked with him. I enquired of Drew whether he had told the missing man, and Drew alleged that he had notified the missing man, who had answered him. It is concluded that the man must either have lost his way in coming out, or have delayed too long before he started to come out, as Drew came out some time after the missing man knew that the mine was on fire, but he does not seem to have known the danger he was in.

"In two or three hours after the fire was first seen it was burning out the mouth of the shaft, consuming the greater part of the ventilating fan. The manager succeeded in getting the shaft covered over, and as No. 3 pit is connected with No. 4 pit, the fan there had to be stopped, and those shafts were also covered, leaving eleven mules in the mine.

"At present all communication from the surface is shut off, and it is to be hoped the fire will be got out that way; but, if unsuccessful, they are now prepared to turn water into the No. 3 pit from the river (Millstone), as they have got a large ditch cut, by means of which, if it comes to the worst, they will flood the mine. But after they are satisfied that the fire is extinguished it will take a long time to get the water out; the workings of both pits will have to be filled, as No. 3 pit is the lowest mine.

"It is a wonder that there are not more men missing, as there were a great many men in the mine when the fire was first discovered, and the only way of getting out was by a way near where the fire started; and I may here say that Mr. Drew, for the noble part which he undertook, in going and telling those in the mine himself, knowing the risk he was running, deserves the thanks of the community in general, for if it had not been for the prompt action he took there might have been many lives lost.

"No. 5 PIT, WELLINGTON COLLIERY.

"This is a new pit that has been put down by Messrs. R. Dunsmuir & Sons during the past year, and is about 1,000 yards in a northerly direction from No. 4 pit. They commenced work here on the 20th May, continuing at it by day and night, excepting during short delays now and again, nothing serious taking place, when, on the 20th August, the top of the coal was struck at the depth of 234 feet from the surface, and only three months after starting to sink. In this place they found the coal 13 feet thick, hard and of its usual good quality, and what is known about here and California as Wellington coal. They went below the coal 8 feet, making the shaft 255 feet deep; size inside, clear of the timber, 18 feet by 8 feet, the whole being complete on 30th August.

"There are here engines, coupled with boilers, and everything complete. The head gear, upper works and everything necessary for a large output of coal is now in good order. The railway is also in to this place. The first train of cars loaded with coal went away by the locomotive on the 5th September. This looks as if it was going to be a valuable mine, and proves a large portion of the Wellington estate. Ventilation is good; at present the motive power is a steam jet. The mine is almost free from gas. We are here 1,000 yards from No. 4 pit. This firm has now started to put down another shaft about midway between the No. 4 and No. 5 shafts, known as

"No. 6 SHAFT, WELLINGTON COLLIERY.

"This shaft is of the same dimensions as the other shaft that Messrs. R. Dunsmuir & Sons have put down, viz.: 18 feet by 8 feet. It is being timbered as they get down. They are now down about 75 feet. There is a steam engine to hoist the rock and water from the shaft, so that in all likelihood they will be getting coal from this shaft early in the spring.

"EAST WELLINGTON COLLIERY.

"In my report of 1883 I stated that this place did not look well for getting out coal, as the coal kept thin and was sometimes soft; but for all these discouraging prospects the enterprising proprietor—Mr. R. D. Chandler—continued to work at it both up and down the valley of the Millstone River, with many side drifts. The one down was in an easterly direction, but it is now stopped, after continuing it for about 1,000 yards with no improvement, and no indications of getting better, and the rails were taken out. On the west, or going up the valley towards the Wellington Colliery, there has always been about 20 inches of hard coal; sometimes it would be somewhat thicker. This place is now in about 500 yards from the shaft, and is yet being pushed ahead with great expectation of getting the coal good. For some time back it has been improving, both in thickness and quality; now it is fully 3 feet and keeps getting thicker as they approach towards Wellington, so that there may yet be good and profitable work got here.

"They have now started a bore hole from the surface about 600 yards ahead of the drift, going to the eastward. This is now down 300 feet, and they have the hope that they will strike good coal soon. And it is wished that they will, as they have gone to a great expense and as yet had no adequate return.

"GENERALLY.

"All the above-mentioned works I have frequently inspected during the year. I found them generally in good order, with plenty of timber and every other thing that was necessary; and I may here say again, that on my inspection of No. 3 Pit, Wellington Colliery, previous to that memorable explosion, I never saw a mine in better order, and it did not appear in want of anything that was necessary.

"In the course of my inspection of the several mines I have noticed that sometimes the brattice in some places was not so close up to the face as it should be; and when I have pointed this out it has been alleged that the brattice had always to be put up three or four times, as it got broken down so many times, the coal from the shots being almost sure to break down the brattice when close to the face.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES OF BRITISH COLUMBIA FOR THE YEAR 1884.

"12th January—Chinaman, name unknown, was slightly injured by a fall of coal when at work at East Wellington Mine.

"16th January—Chinaman, Gin Lin, got a leg broken by being caught in a rope when he was lowering a car down an incline in No. 4 shaft, Wellington Colliery.

"16th January—Thomas Cassidy, miner, was bruised by coal from a shot in East Wellington.

"23rd January—Joseph Walker, miner, was burned about the face and hands by accidentally setting fire to about half a pound of powder in the South Field Mine.

"24th January—James Frame and William Hinksman, miners in East Wellington Mine, were burned about the face and hands by an explosion of gas. They were doing some repairs and were to keep anyone from joining in, yet the latter went in with a naked light; hence the explosion and burning.

"30th January—G. Brinn, miner in No. 1 shaft, Nanaimo Colliery, was slightly hurt about the back, by a piece of rock striking him while putting in timber.

"5th February—Andrew Moffat, mule driver, got one of his legs broken by getting jammed between the box and the shaft in the Wellington Mine.

"11th February—Thomas Laughton, miner, and Ah Heang were slightly burned about the hand and face by an explosion of gas. They were working at a fault, and had struck the coal when it fired on them, in No. 3 shaft, Wellington.

"13th February—James Lomas, miner, burned about the face and hand by the firing of loose powder, while getting ready to charge a hole in No. 4 shaft, Wellington Mine.

"15th February—John Preacher, miner in No. 1 shaft, Nanaimo Colliery, was slightly burned about the face and hands by an explosion of gas.

"19th February—Ah Hin was slightly burned about the face and hand by an explosion of gas in No. 1 shaft, Nanaimo Colliery.

"20th February—John Dunn, miner in South Field Mine, was hurt about the face by a blast, by returning to the shot before it went off.

"22nd February—Joseph Guthro, fireman; Joseph Randle, David Hardy, and Samuel Harris, miners working in No. 1 shaft, Nanaimo Colliery, were seriously burned by an explosion of gas, kindled by a shot.

"The above Samuel Harris died on the 28th February, and Joseph Guthro died on 27th March. *See* inquest.

"22nd February—John Lowrey, miner in No. 3 shaft, Wellington Colliery, was severely injured by a piece of coal falling on him, the same having been loosened by a shot.

"18th March—James Jamieson, miner, South Field Mine, got one side of his face severely cut with coal from a shot. He had returned to his working place before a shot went off which he had lighted.

"21st March—Joseph Davey, miner in South Field Mine, was slightly hurt, being caught by the loaded cars on the slope. He seems to have been taken sick and could not get out of the way.

"22nd March—J. C. Merritt, miner, working in the new slope, South Field, was killed by the falling out of one set of timbers and about two feet of gravel.

"24th March—Isaac Emblem, miner, was slightly hurt about the leg, by being struck by a piece of coal he was taking down, in South Field Mine.

"24th March—Ah Joe got one arm broken and one leg bruised by a piece of coal falling on him while at work in No. 4 shaft, Wellington Colliery.

"15th April—Ah Chune got seriously injured about the back, by being jammed, while riding on a loaded car in the South Field Mine.

"30th April—Neil McLean, miner, was killed, and Foo King had his leg broken, by rock falling on them from the roof while at work in their stall in the East Wellington Mine.

"The above-mentioned Foo King died on 22nd August.

"2nd May—S. B. Rolley, miner, was severely injured by the premature discharge of a shot in No. 4 shaft, Wellington Colliery.

"27th May—Thomas Nicholson, miner, was slightly hurt on one arm by being hit by a piece of rock thrown from a shot in No. 1 shaft, Nanaimo Colliery.

"28th May—John Beahan, miner, was slightly burned about the arms and neck, by the firing of some gas in his stall in No. 4 shaft, Wellington Colliery.

"30th June—John Eno, Michael Wilkinson, Ben. F. Jose, James Donohue, John Gill, John Jones, Barney McGinnes, John Winders, John Frear, James Conndley, Thomas Pettigrew, Daniel Evans, Harry Arnold, Christopher Hoskins, Dominico Ricono, Vittoria Berdotti, Bettoni Lazarro, Milletto Domionico, Martin Lowry, John Lowry, Peter Traffo, Rosetti Vergino, and Roberto Vergino were killed; Charles McGarrigle and Henry Roberts were badly injured, and William Simpson, Thomas Jones and Evan Richards were slightly injured, by an explosion of gas in the No. 4 level of No. 3 shaft, Wellington Colliery, supposed to have been kindled by John Frear, deceased.

"10th July—William Dunstan, miner, was severely injured by the premature explosion of a shot in No. 4 pit, Wellington Colliery.

"12th July—Sam (Chinaman), employed by H. Coulter, was killed by being jammed between a loaded car and the coal in No. 4 pit, Wellington Colliery.

"1st August—George Bertram, miner, working in No. 1 shaft, Nanaimo Colliery, was slightly injured by coal falling upon him

"2nd August—Peter McClousky, miner, when working in No. 1 shaft, Nanaimo Colliery, got his foot hurt by coal falling on it.

"8th August—Thomas Davis, miner, was killed by a piece of coal falling on him, while at work in the No. 4 shaft, Wellington Colliery.

"27th August—Duncan McDonald, miner, was injured by coal falling on him while at work in his stall in the No. 4 pit, Wellington Colliery.

"29th August—George Mirando, miner, was slightly burned about the face and arms by a slight explosion of gas, while at work in his stall in South Field Mine.

"30th August—Harry Edwards, miner, was killed by a fall of coal, while at work in his place in No. 1 shaft, Nanaimo.

"3rd September—Daniel Evans, miner, was injured by a fall of coal and rock on him, while at work in his stall in the Wellington Mine.

"20th September—Ah Bong, loader, was injured by a piece of rock falling on him while at work in the Wellington Mine.

"20th September—Chung (Chinaman), runner, was seriously injured by being jammed with a loaded car in No. 3 pit, Wellington Colliery.

"9th October—H. Hilton, miner, was slightly hurt about the face and breast by coal thrown from a shot, in South Field Mine.

"10th October—Loot Lum (Chinaman), runner, had his leg broken by a water car in East Wellington mine.

"12th October—James Price, fireman; David Morgan, bratticeman; John Isbister, runner, and one Chinaman were all slightly burned by an explosion of gas in the new slope, South Field.

"27th October—A Chinaman runner in the South Field Mine was cut about the jaw by an iron rail sliding off the car he was running.

"26th November—Ah Hin, working in No. 5 shaft, Wellington Colliery, attempted to go across the bottom of the shaft, when he was caught by the descending cage and got slightly injured.

"8th November—James Pargeter, working in No. 1 shaft, Nanaimo Colliery, got his ankle hurt by being jammed with the fly-wheel of a steam engine.

"14th November—Murdoch Smith, miner, was seriously injured by the descending cage in the No. 5 shaft, Wellington Colliery, when he was going across the bottom of the shaft, after he had been frequently told not to do so, as the cage was coming.

"19th November—George Evans, miner, was seriously injured by coal falling on him while at work in his stall in the South Field Mine.

"9th December—Thomas Morgan, fireman in the New Douglas Mine, was slightly hurt about the head by a piece of rock falling on him when taking out brattice.

"16th December—C. Moore, runner in No. 1 shaft, Nanaimo, was slightly jammed about the head between the roof and an empty car.

"I am sorry to have to make a list of so many accidents for the year that has closed, both serious and fatal. Although some of the accidents were slight, yet they were casualties which had to be reported.

"Of the accidents in the list, six were by falls of rock from the roof, eleven by falls of coal, ten by shots and loose powder, eight by cars in the mine, two by descending cages, one by an engine (below), and forty-two by explosions of gas.

"In looking over the list of accidents you will observe that there were thirty-one fatal

three of which were caused by rock, two by coal, one by the cars, and twenty-five by explosions of gas. I have enquired into all of the accidents which have happened, and in the fatal cases inquests have been publicly held, in which all the evidence was taken that it was possible to get.

"I know you have not lost sight of the explosions which occurred on the 22nd February and 30th June; but after what has already been made public concerning those accidents in the newspapers, even up to this time there is no fresh evidence that I can bring before you, other than what was taken at the inquests, one of which was conducted by the Attorney-General and lasted three days. The depositions and proceedings at the inquests held on the fatal accidents are filed in the Attorney-General's office, and I beg leave to refer you to the same. With the exception of one by a car, all the other five fatal accidents took place at the face of the workings—three of them by rock, two by coal. The miner is under the direction of the overman, if that officer should see anything which he thinks dangerous, when he is going amongst the miners in their working places. The miner also is supposed to be able to judge for himself and to see when he is in danger. There are, however, besides the practical miner, a great many men employed in the mines who were never in a coal mine until they came here. Some of them are very careful workmen, but others, again, do not know when they are in danger; and therefore the overman, or some one under him, has to pay special attention to the latter persons.

"Accidents will happen sometimes to the most careful and experienced workman; but yet, one reckless person in a place of trust in a mine that gives off gas may be the means of causing a sad calamity to all those around him.

"Amongst the accidents you will note that there have been ten casualties by powder, one way and another. Per favors from the managers of the respective collieries I have been furnished with the quantities of blasting powder which have been used in the mines, amounting in the aggregate to 270,165 pounds (besides several thousands of pounds weight of giant powder, used in rock work, shaft sinking, &c.) The quantity of powder used is a large amount, in proportion to the output of our mines. Of course, I am not in a position to say that it might be less, the miners being best judges when powder is required and when it is not; and I have thought it well to bring the large amount of powder used under your notice, that the public might know what is used, and that due consideration may be given to the accidents that proceed from that cause, when, I submit, that all things being considered, the number of accidents, in their fewness, will compare favorably with any other mining district where such a quantity of powder is used.

"Appended hereto are the Annual Colliery Returns. I have, &c.,

(Signed) "ARCHIBALD DICK,
"*Government Inspector of Mines.*"

COLLIERY RETURNS.

NANAIMO COLLIERIES.

Output of coal for 12 months ending December 31, 1884.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1884.	No. of tons unsold, including coal in stock, Jan. 1, 1885.
133,858 19-20	28,103	104,813	105 6-10	1,048 5-10.

Number of hands employed.			Wages per day.		
Boys.	Whites.	Chinese.	Whites.	Chinese.	Boys.
2	348	191	$2 to $4	$1 to $1.25	$1 to $1 50

Total hands employed (not including laborers employed by the miners)..... 541

Miners' earnings, per day .....$2.50 to $4

Name of Seams or Pits—New Douglas (or Chase River), South Field, and No. 1 Shaft.

Value of Plant—$350,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—Chase River, worked by slope, seam averaging 6 feet; South Field, worked by slope, seam 6 to 12 feet; No. 1 Shaft, worked by shaft, seam 7 to 10 feet.

Description and length of railways, plant, &c.—Railway from Douglas Pit to loading wharves, with branches and sidings, 1⅓ miles in length; railway, with branches and sidings, from Chase River to loading wharves, 2 miles in length; railway, with branches and sidings, from South Field to loading wharves, 3 miles in length; railway, with branches and sidings, from No. 1 Shaft, Esplanade, to loading wharves, 1 mile in length. The railways are of steel rails, with gauge of 4 feet 8½ inches; eight (8) hauling engines, some of which are also adapted for pumping; ten (10) steam pumps, four (4) locomotives, one hundred (100) coal railway waggons, turning lathes, steam hammer, screw cutting and other machinery of fitting shops, diamond boring machine, capable of boring to 2,000 feet; wharves, bunkers, &c.

SAMUEL M. ROBINS,
Superintendent of the Vancouver Coal Mining and Land Company, Limited.

WELLINGTON COLLIERIES.

Output of coal for 12 months ending December 31, 1884.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1884.	No. of tons unsold, including coal in stock, Jan. 1, 1885.
254,538¼	58,746 9-20	196,931	1,725 12-20	586 8-20

Number of hands employed.			Wages per day.		
Boys.	Whites.	Chinese.	Whites.	Chinese.	Boys.
12	361	299	$2 to $3.75	$1 to $1.25	$1.25 to $1.50

Total hands employed..... 672 | Miners' earnings, per day ....$3 to $4

Name of seams or pits—Wellington.

Value of plant—$250,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—6 to 10 feet thick; 3 shafts working, 1 not working; 1 slope working; 1 adit level working; 2 air shafts and 1 sinking; 1 of these with large furnace at bottom, 1 with ventilating fan 30 feet diameter, driven by a pair of engines; 1 fan 12 feet in diameter.

Description and length of tramway, plant, &c.—10 miles of railway, 6 locomotives, 197 waggons, 10 stationary engines working, 1 engine not used at present, 9 steam pumps, 5 wharves for loading vessels, with bunkers, &c.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31, 1884.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1884.	No. of tons unsold including coal in stock, Jan. 1, 1885.
5,672½	538½	4,734		400

Number of hands employed.			Wages per day.		
Boys.	Whites.	Chinese.	Whites.	Chinese.	Boys.
1	17	13	$2 to $5	$1.25	$1.50

Total hands employed..... ..... 31 | Miners' earnings per day $3

Name of seams or pits—East Wellington.

Value of plant—$100,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—1 seam (irregular); 1 shaft, 8x18x240 feet deep; 3 levels, 6x10 feet; 1 slope, 6x12 feet; 2 slants, 6x12 feet.

Description and length of tramway, plant, &c.—Railroad, 3½ feet, narrow gauge, 3½ miles long; 2 locomotives, 20 4½-ton coal cars, 1 wharf, 30 feet wide and 725 feet long; 1 steam pile-driver, 1 pair hoisting engines, 1 donkey engine, 1 steam saw-mill complete.

W. S. CHANDLER.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer, at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1885,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.
1886.

ANNUAL REPORT

OF THE

MINISTER OF MINES,

FOR THE

YEAR ENDING 31ST DECEMBER,

1885,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.
1886.

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1885.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,046	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
1885	594,782	,, 118,956	713,738	2,902	246
			$ 49,385,866		

REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR 1885.

To the Honourable CLEMENT FRANCIS CORNWALL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1885, is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,
1st March, 1886.

REPORT.

GOLD.

The value of the gold exported by the Banks at Victoria, during the year 1885, is as follows:—

Bank of British Columbia	$ 244,442
Bank of British North America	43,135
Garesche, Green & Co	307,205
	$ 594,782

The statistics show a large increase in the number of miners, and decrease in the average yearly earnings per man. Both these results are accounted for by the rush to Granite Creek towards the end of the mining season, and by an increased number of Chinamen rocking during the autumn months on the bars of the Fraser (already worked and re-worked) with but little return for their labours.

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, 30th November, 1885.

"SIR.—I have the honour to submit my annual report upon the mining industry of this district, accompanied by the customary 'statistics,' which will be found to show a further falling off in the annual product of the mines, as also a decrease in mining population—the late discoveries in the Similkameen country having attracted quite a number from the district.

"The summer was unusually dry until about 1st October, which caused a suspension of work in nearly all the hydraulic claims for some considerable time; at which date, however, rain set in, and a plentiful supply of water for most claims was obtainable until cold weather closed them out (about 1st November).

"On Williams Creek the old claims are showing signs of exhaustion, and but few new ones are being opened up.

"The Black Bull, Victoria, and other claims, on Lowhee Creek, paid very well while the water lasted.

"On Mosquito Creek and Red Gulch the claims, owing to the scarcity of water, were idle a great portion of the summer, but paid fairly for the amount of work accomplished. The Alabama Company, of Mosquito Creek, having obtained a grant of water from Coulter Creek, will, in the spring, commence the construction of a ditch to convey the water a distance of some ten miles.

"Grouse Creek has up to the present contributed about the same as last year to the output of the district. The Waverly Hydraulic Company, from a scarcity of water, made but little headway in the development of their mine. No attempt at a 'wash-up' was made. The Sims Company paid very well, and the Jarvis Company have now their claim in good shape for next season's work, which promises well.

"The benches on Lower Antler Creek show a decrease in their annual product, fewer men (Chinese) being here employed.

"The Nason Company, on Upper Antler, I much regret to say, have not as yet succeeded in getting into the deep channel, news of which is daily looked for with much anxiety. The unfortunately fatal accident which occurred in this claim last spring, whereby James Blair lost his life by the bursting in of the water and gravel from the channel into the bed-rock "drive," shows the necessity of exercising caution in "tapping" the channel, which necessarily retards the progress of the work.

"Although quite a large amount of gold has been taken out on Slough Creek this summer by the Chinese, no new discoveries have been made. Lightning Creek and its tributaries have produced about the same as in 1884.

"Sugar and Hardscrabble Creeks have not realized expectations. The rumoured discovery of rich bench diggings on Sugar Creek in October caused some excitement here, and a rush in that direction was made; but so far no one has, apparently, sufficient faith in the ground to make a record of it, although some are of opinion that if water was brought on the ground fair pay would be obtained.

"It will be observed that the 'statistics' show a material decrease in the number of Chinese engaged in mining as compared with last year. This, in a measure, may be accounted for by the coming in force of the 'Chinese Regulation Act, 1884,' to circumvent the operation of which recourse was had to every subterfuge, especially to avoid the payment of the fifteen dollars for miner's certificates. Latterly, however, many have yielded to the inevitable, and are taking out certificates rather than lose their claims or relinquish their favourite occupation.

"The inauguration by Government of a geological survey of the district, under the supervision of Mr. Bowman (of the Dominion Geological Staff) is regarded as of the most vital importance to the district, as well as to the Province and Dominion, and although the season was far advanced before the party arrived upon the scenes of their labour, yet by the industry and perseverance displayed no doubt much valuable information was obtained, which will prove serviceable in proceeding with a more detailed survey, as, of course, the few weeks at Mr. Bowman's disposal was necessarily devoted to obtaining a general outline of the country. While on this subject it will not, perhaps, be out of place to notice a paragraph which recently appeared in one of our Provincial newspapers (taken from an eastern paper) purporting to give Mr. Valigny's (Mr. Bowman's draughtsman) views respecting our quartz ledges. Mr. Valigny is reported to have said:—'In the quartz ledges examined in the neighbourhood of Barkerville, no free gold was found, and doubtful prospects were entertained if they could be worked profitably,' etc. Such a statement coming (if so) from a member of the Geological Survey Party is calculated to do serious harm if not corrected, as the same might naturally be taken as Mr Bowman's views. The facts are: Mr. Bowman (who was the only person in the party professing any knowledge of geology) visited but one or two ledges in the vicinity of Barkerville, and these certainly not with a view of passing upon their value, his time being too much taken up in making a 'superficial survey' of the country to devote any portion of it to an examination of the ledges (which he proposed doing had he the time left before cold weather set in). Many persons were most anxious to have Mr. Bowman go with them and examine ledges quite near Barkerville, but his answer was invariably to the effect that he must first get through with the work he had in hand, viz, a superficial survey of the country. It is, therefore, quite impossible that Mr. Valigny, speaking either from his own knowledge or that of Mr. Bowman, could have made use of the expressions ascribed to him.

"Very little prospecting for new gold-bearing creeks has been undertaken this summer, and that little without apparent results.

"In making representations in support of an application for Government assistance in procuring a prospecting outfit, a Mr. Dupre, of Quesnelle, corroborates the reports of Messrs. Stewart, McGuire and party made two years ago (which will be found in the mining reports of that year) to the effect that there is to the N. E. of Barkerville (from 75 to 100 miles) a very promising gold bearing section of country as yet but little explored. Mr. Dupre says that in 1883 he panned out from a hole he had sunk on a small creek, about 75 or 80 miles down Fraser River from Tête Juane Cache, three dollars in gold dust in a few hours; being without provisions he came down for supplies and assistance, which up to the time he made application for Government assistance he had been unsuccessful in obtaining.

"I believe this section of country well worthy the attention of prospectors.

Quartz.

"Another year has passed without any material development of our quartz ledges, and if I except the efforts now being put forth by the Quesnelle Quartz Mining Company, nothing has been attempted.

"The Quesnelle Company are, however, at the present time making a most laudable attempt to prove the value of their mine at Hixon Creek, having purchased engine and machinery in San Francisco and engaged the services of experienced California quartz miners. The Company are at present cutting a road from Fraser River to their mine, a distance of ten miles, over which they will take their heavy machinery as soon as completed. Some eighteen men are employed by the Company, and as soon as the machinery is placed in position work on the ledge will be started and crushing carried on during the winter.

Gold Yield for 1885.

"I estimate the total output of the district for the year as follows:—

Barkerville Polling Division	$ 120,700
Lightning Creek "	76,500
Quesnellemouth "	62,400
Keithley Creek "	68,100
Estimated product from date to 31st December	20,000
	$ 347,700

"Cariboo has not as yet received any benefit from railway construction. Freights are still high, and Cariboo prices have undergone but little change since my last annual report.

"I have, etc.,

(Signed) "JNO. BOWRON,

"*Gold Commissioner.*

"*To the Honourable the Minister of Mines.*"

MR. STEPHENSON'S REPORT.

"FORKS QUESNELLE, 9th Nov., 1885.

"SIR,—I have the honour to forward herewith the estimated yield of gold for Keithley Division of Cariboo District, for the year 1885:—

"The returns show a falling off from last year, but there has been a considerable decrease in our mining population for the last year; and also it is impossible to get at a true estimate, as the greater part of the gold in this section is mined and goes away through the hands of the Chinese, and there is no satisfactory information to be obtained from them: then a great deal of the mining of this section is desultory, the Chinese miners being scattered all over this section of country. They generally work in pairs, and carry their whole mining out-fit with them. When their grub gives out, they make for the nearest trader, lay in a new stock, and away again; thus they go for the whole season, until the cold weather drives them into winter quarters. Of course there are a few organized companies, but the larger portion of the Chinese mine as above.

"During the last summer, two men, S. Kyse and E. Hilton, have been out in the mountains about the head of Quesnelle Lake They returned about the 10th of October, after a four months' prospecting trip. They say they did not find anything to excite them, but they found some gold, and intend to go back next summer to further satisfy themselves on what they found, as owing to the fall freshets coming on they could not finish their prospecting this season.

"There has not been much done at Horsefly this last season, only one company of Chinese working there; they admit they are taking out good pay. The ground all round the China Company's claim is held under a lease by Mr. T. Harper, which prevents considerable prospecting being done there this winter There has not been any work done upon the ground by Mr. Harper since the lease was obtained.

"There is a company of white men prospecting on Black Creek, a tributary of Horsefly. They intended to winter there, and it is to be hoped they will find diggings that will pay them for their labour and enterprise.

"In the face of all the cry about hard times and no money, the traders seem to ship as heavy as usual, and the money must come out to pay for the goods, as I do not believe the traders give all their goods away. A few years ago the traders made an outcry about high freights and a toll bridge at this place. Well, that bridge has been free for the last season; freights also have been moderate to this place, but the price of goods are quite up to former years, as the following retail prices at the Forks Quesnelle and Keithley Creek will show:—

"Flour, 10 to 12 cts. per pound; butter, 62½ to 70 cts.; beef, 12½ to 15 cts.; bacon, 35 to 40 cts.; dried apples, 40 cts.; rice, 16 to 18 cts.; beans, 15 cts.; potatoes at Forks Quesnelle, 3 cts., at Keithley, 5 to 6 cts.; tea, $1.25 per pound; tobacco, $1.25 per pound; candles, 45 cts. by the box; gum boots, $12 per pair. These things are the bare necessaries. If we want to go for any of the luxuries, such as there is to be had, then the trader wants to make a little profit, and—well he makes it—as they claim they can't keep even on staples at the prices they are selling at, and they try to get square on the other articles.

"The construction of the Canadian Pacific Railway has made a boom in the lower country, but so far has acted adversely to the mining industry of Cariboo, as by it employment of teams and pack trains up to the last season, it has kept freights high to Cariboo; also when men that were mining became discouraged, or doubtful of their claims, they had railroad work to fall back upon, and away they went; but now that the Canadian Pacific Railway is about finished, we may look for low freight, so that living will be much cheaper than heretofore; also Cariboo may get a share of the influx of people which the Canadian Pacific Railway is bound to bring into the Province, and probably see better times than the present.

"I have, &c.,

(Signed) "W. STEPHENSON,

"*Government Agent.*

"*To the Hon. Minister of Mines,*
"*Victoria.*"

CASSIAR.

MR. CRIMP'S REPORT.

"LAKETON, CASSIAR,
"10th October, 1885.

"SIR,—I have the honour herewith to forward the mining statistics for 1885, as well as my report upon the district.

There is a considerable falling off in the yield of gold this year from last, from two reasons; the first is, there has not been so many miners in the district as there was last year; and, secondly, the Chinese have done very poorly in consequence of all the beds of the several creeks having been thoroughly worked out—some of them three times over. The past season the Chinese have recorded but few claims. They have worked from point to point all over the several creeks, wherever they could make a few dollars. They do not, as a rule, care about prospecting in the hills. Most of the gold taken out this year has been from high benches and in the hills.

"The yield for the past season, as far as I can ascertain, is as follows:—

Dease Creek	$12,350
Thibert Creek	12,600
Defot Creek	3,650
McDame Creek and its tributaries	19,000
Desultory mining	3,000
Total	$50,600

"There is considerable prospecting being done in the hills, and from present indications look very encouraging. A few days since the Arctic Rose Company, situated about 4½ miles up Dease Creek, found, after running through rock, a hill channel which prospects well. They got as high as $14 to the pan, and it is thought that there is a hill channel running the south side of this creek nearly its length, and in consequence many claims have been taken up, and I think this creek will give a good return next season.

"On Thibert Creek there will be some prospecting done this winter—running tunnels into the hills,—and it is confidently expected that good claims will be found. And also on McDame Creek miners are turning their attention to the hills and benches.

"There has not been any new creeks found the past season. There were five miners built a boat and got a supply of provisions, and went up the Liard River to San Francisco River and prospected most of the summer, but did not find gold in paying quantities.

"Very few miners are leaving here this winter. There will be more winter here than ever before; and most of them are confident that they will have a better return for their labours next year than the past one.

The market is well supplied with everything. Vegetables are abundant and reasonable in price.

"There will be about 90 men winter on the several creeks—about equally divided—whites and Chinese. It has been a very healthy season; no sickness among the miners.

"The crops on the banks of Stickeen River have been abundant and of excellent quality, and on the whole the outlook for this district for the coming season is rather encouraging.

"I have, &c.,
(Signed) "J. L. CRIMP,
"*Gold Commissioner, Cassiar.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

LILLOOET.

MR. SOUES' REPORT.

"CLINTON, B. C., Dec. 21st, 1885.

"SIR,—I have the honour to enclose herewith the mining statistics, and my annual report for the District of Lillooet for 1885:—

"The total ascertained yield of gold for the district this year, is $94,774. With the exception of 1884, this is largely in excess of former years. The figures given are perfectly reliable. Mr. Smith, Lillooet, reports his purchases of gold for the year at $51,236; Mr. Foster, Clinton, $20,752, and Mr. Bell, Clinton, $11,000. The balance ($11,786) is the amount acknowledged to have been purchased by Chinese and other traders throughout the district, and I have no doubt is very much under-estimated.

"On account of long continued high water, the mines on Bridge River and its tributaries, did not turn out as favourably this year as was expected. With a favourable stage of water next year, I have every reason to believe, from good authority, the returns from that quarter will be much larger next season. Many of the white miners intend returning there in the spring. The gold found there is of a coarse nature, with nuggets varying from $10 to $22, and sells in Lillooet at $16.50 per ounce.

"A large number of nomadic Chinese have been mining during the past year on various parts of Bridge River, and also along the line of Fraser River, on both banks. The result of their labour, and how disposed of, it is impossible to ascertain.

"I regret to have again to report no work done on the Big Slide Lode.

"In minerals other than gold, I have to report work has been prosecuted on Mica Discovery Claim, on Clearwater, during the short season of that quarter. I have also to report that four other claims of the same mineral have been discovered and located in that neighbourhood this year.

"From information received, I have good reason to believe that this portion of the district will give good returns in next season's report.

"I have, &c.,
(Signed) "F. SOUES,
"*Gold Commissioner.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

YALE.

Similkameen Division.

MR. ELWYN'S REPORT.

"VICTORIA, B. C., 23rd Nov., 1885.

"SIR,—In accordance with your instructions, I left here on the 23rd ultimo and proceeded, *via* Nicola, to Granite Creek, which I reached on the morning of the 29th ultimo.

"This stream is a tributary of the Tulameen, or North Fork of the Similkameen, and falls into that river, on its right bank, about 12 miles above its junction with the South Similkameen at Princeton,—perhaps better known as the Vermillion Forks, or still better as "Allison's."

"About five miles from its mouth, Granite Creek is joined by a small tributary from the south-west, and the point of junction is called by the miners "The Forks." Not being a true fork, it is a misnomer, but, for convenience, I shall retain the name when speaking of the locality in this report.

"Looking up the valley of the creek from high land just below the forks, the bearing is *from* the south-east, and, in the distance, from east of south-east. Looking down stream from the same point its general course to the Tulameen is about N. 30 E. (mag.)

"With the exception of a few hundred yards at its mouth, Granite Creek runs from the forks downwards in a deep V shaped gorge, through which the yearly freshet, evidently of great volume, has washed everything except the gold and some gravel,—in fact this portion of the creek has been ground-sluiced by nature.

"From near the mouth of the creek to a point something over half a mile below the forks, a distance of about four miles, no claim which has been tested on both sides of the bed of the stream has failed to yield good returns, and it may safely be said that the ground for that distance will average over an ounce a day to the hand. From the point indicated upwards, continuous pay has not been discovered, but there is every indication that this wonderfully persistent lead of heavy gold will there be found in the hill on the proper left bank of the creek It afterwards appears to cross the creek to the right bank, and possibly continues in that bank to beyond the short canyon through which Granite Creek runs, just before its junction with the tributary from the south-west at the forks. I have not myself been above the last-named point, but am told the bed of the stream is there considerably wider, the valley not so distinctively V shaped, and the ground much deeper. For these reasons the time has been too short for a proper test to have been made of this portion of the creek, but for a distance of five miles men are at work, at intervals, and I heard of a prospect being obtained by some Frenchmen, during the time I was on the creek, over which they were much excited. Some experienced miners have a very high opinion of the upper creek—called erroneously, perhaps for recording purposes, the South Fork,—but it is right to point out that, although there is every probability of the run of gold extending above the forks, it has not yet been proved to do so.

"The creek is a long one, from twenty-five to thirty miles, and, in addition to the annual freshet, is subject to floods from rainfall during the autumn months. On this account many miners contend that the early spring, before the snow on the mountains begins to melt, will be the best time for work. In judging as to the feasibility of this it should not be forgotten that the mouth of Granite Creek has only about half the altitude of Barkerville, and three and a half degrees advantage in latitude.

"On the 31st October, on lower Granite Creek, there were 62 companies owning creek claims, averaging probably 300 feet to the company, who were working. Of these 34 were taking out gold and 28 either preparing to do so or prospecting. The gold admitted to have been taken out by the several white and Chinese companies, from 5th July to 31st October, amounts to the large sum of $90,000, which, considering the great loss of time caused by the freshet, and also the difficulty of obtaining lumber for sluice-boxes, is a creditable showing. It is almost certain that the actual total is more, but that yield can be given without any possible fear of exaggeration.

"Chinese have for years been mining on the banks of the Tulameen many miles *above* the mouth of Granite Creek, and it is, therefore, probable that other gold-bearing tributaries of that river, issuing from the same slate range, will be found.

"The wonderful richness of the developments in Cariboo during the autumn of 1861 attracted thither, in the following spring, the miners who had been working on the bars of the Similkameen, and who would doubtless, under other circumstances, have followed the gold to its source in the same way as their brother miners working in 1858–59 on the bars of the Fraser had done. This appears to me to be a sufficiently satisfactory explanation of the delay which has occurred in the discovery of this new gold field, so far as miners are concerned; Chinese, however, have been passing the mouth of Granite Creek for years, and their failure to find out its value goes far to prove the assertion, often made, that they *never* prospect in any true sense of that word. It is indeed most fortunate that such has been the case in this instance, for had the Chinese working on the Tulameen come to know of the easily worked and rich ground on Granite Creek, it would have been quietly gutted, without our knowledge and without any appreciable benefit accruing to a single white person.

"I was particularly impressed with the fact that those who were warmest in praise of these new diggings were among the most experienced miners there; and certainly I have not, so far, seen any report in the newspapers which has gone beyond the truth. The statements made as to the yield of the claim owned by Messrs. Sherburne & Rashdell, near the mouth of the creek, are quite correct, and it may be added that as they are not working on bed-rock the possibilities for this claim are very great. Other reports—such for example as Messrs. Briggs & Bromley taking out $400 in an afternoon with a rocker—might also be verified, but it seems unnecessary, and I shall confine myself to giving one instance of good pay being obtained which I have not seen reported. On Sunday morning, the 1st instant, the Point Company, situated about two miles above Capt. Sherburne's ground, washed up 45 ounces, or over $750, as the result of the labour of eight men for thirty hours. This claim is owned by Messrs. Pearce and Harvey, the former of whom is one of the pioneers of Cariboo, and well known throughout that district.

"There is associated with the gold on Granite Creek a very hard, heavy, and whitish metal, which is probably platinum or iridium, perhaps a mixture of both. I brought away with me about half an ounce as a sample. There are no means of thoroughly testing it here, but Dr. G. M. Dawson, Assistant Director of the Geological Survey of Canada, has kindly offered to take it to Ottawa for examination in the laboratory there, after which it will be forwarded to London for exhibition at the Colonial and Indian Exposition to be held next year.

"I believe that the discoveries on Granite Creek will lead to the opening up of an extensive gold-field—a gold-field in fact which, from its accessibility and close proximity to farming districts, producing beef, flour, vegetables, oats, and hay, will be of more benefit to the Province than any, with the exception of Cariboo, hitherto discovered. In this opinion I may, of course, be wrong, but I venture to submit that even so, the finding, at the close of railway construction, of a lead of heavy gold, having a steady run for so great a distance as four miles, is a matter of the greatest importance, and an event on which the Province may be most heartily congratulated.

"On the left bank, at the mouth of the creek, a level bench offers a good site for a town, and is being rapidly covered with log houses. At the time of my visit there were seven general stores (three of which were kept by Chinese), two restaurants, two licensed houses for the sale of liquors, and a butcher's shop. In addition, there were about fifteen houses in course of construction, and more or less building will probably be carried on during the winter. I estimated that there were between 400 and 500 white men, and from 150 to 200 Chinese, on and in the neighbourhood of Granite Creek. It is extremly difficult to do more than guess at the number of men who will winter in a mining camp the first season. I think, however, that there will be not less than two hundred white people, unless a scarcity and consequent high price of staple articles should drive them away.

"It is probable that a very short summer route to Granite Creek can be obtained by taking, at the end of the waggon road from Hope, the left or Canyon trail, instead of the right or Grant trail, which is usually followed. The head waters of Granite Creek cannot be many miles from the Canyon trail; it is possible that some of them cross it; and if a practicable route could be found in this direction it would save a long detour to Allison's, and twelve miles of very bad trail from there up the Tulameen to the mouth of Granite Creek. In the event of the upper portion of the creek turning out well, the saving in distance would be still greater.

"For a waggon road the valley of the Coldwater, which falls into the Nicola at Coutlie's, will probably, eventually, be found to be the easiest line. It is a matter, however, which must be determined by explorations.

"I intended to have appended a list of prices to this report, but there has already been a sharp rise in flour, and as the same thing is likely, in my opinion, to occur in other articles, such a list would only be misleading, and is, perhaps, better omitted. I may say, however, as giving a general indication of prices, that fairly good meals are obtainable at the low rate, for a mining camp, of fifty cents.

"I have, &c.,
(Signed) "T. ELWYN,
"*Deputy Provincial Secretary.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

MR. ALLISON'S REPORT.

"PRINCETON, November, 21st, 1885.

"SIR,—I have the honour to forward the mining statistics, with my report of the mining industries of Similkameen District, for 1885.

"The following returns are from personal knowledge:—

Granite Creek	$ 49,000
Tulameen River	60,000
Similkameen River	3,500
	$112,500

"The above estimate, I think, is far below the actual amount taken out the past season. In the present state of excitement and exaggeration I cannot get reliable information. The most successful miners have been the Chinese, but owing to their aversion to give information it is impossible to estimate the amount taken by them. The Chinese traders are doing the greater part of the business, and statements I get from them, I am convinced, are far below the actual amount received. I have myself handled 1,000 ounces of gold dust.

"The past season has been one more of exploration and prospecting than of actual mining. As the season closed a number of new discoveries have been made. New developments on the South Fork of Granite Creek promise well. Discovery claims have been granted on Collins Gulch, Slate Creek, Hines Creek, and Eagle Creek, but the season is too far advanced to test the value of these new creeks. They are tributaries of the Tulameen; the last named is about 35 miles above the Forks of the Similkameen.

"The weather proving mild and favourable the miners at this date are paying more attention to the upper waters of the Tulameen, and a number of records have already been made. Also, records on two quartz lodes, one situated near the mouth of Granite Creek, and the other near Hines Creek, on the Upper Tulameen.

"I estimate the number of white miners at 450. Chinese are so scattered that I cannot form an estimate of their number. About 100 Free Miners' Licences have been issued to Chinese.

"I have &c.,
(Signed) "J. F. ALLISON,
"*Assistant Gold Commissioner.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

MR. NICHOLSON'S REPORT.

"GRANITE CREEK, B. C.,
December 8th, 1885.

"SIR,—I have the honour to inform you that I left Granite Creek in the early part of November in order to complete the Assessment Roll of the district.

"During my absence some fresh discoveries were made, more particularly in what is known as the South Fork of Granite Creek, besides some small creeks. I have now to report the discovery of another large creek, called 'Champion Creek.' This creek empties itself into the Tulameen River some twenty miles above the mouth of Granite Creek; though twelve

miles up it, it is within two or three miles of the North Fork of Granite Creek. I am informed that it is a wider creek than Granite, though not carrying so much water, and the discoverers, as well as others who have located claims, appear well satisfied with their prospects; the advanced stage of the season precluding, however, any very thorough work being done.

"Some very pretty gold was brought into Granite City yesterday from a small creek about ten miles above here, and these prospects were considered so good that in face of a heavy snow-storm a large number of men started the same night for the scene of the new discovery.

"The mildness of the winter is permitting of considerable work being done on some of the bars of the Tulameen River, and the results so far are so satisfactory that many of the old miners consider that the river may be worked with profit for miles, and, consequently, cause to be developed one of the most extensive mining camps in British Columbia.

"Granite City is rapidly increasing, buildings of one kind or another now probably number two hundred. Provisions are fairly plentiful, pack-trains coming in continually from the Nicola Valley. Potatoes are possibly scarcer and dearer in proportion to anything else, being seven cents per pound; flour varies from $9 to $10 per 100 pounds; beef, ten cents per pound, and groceries at fall prices. Board, $8 per week. There are at the present time between 500 and 600 white men, besides some 300 Chinese, in the camp, and with few exceptions this number will winter here.

"I have, &c.,
(Signed) "HENRY NICHOLSON,
"*Recorder.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

MR. TUNSTALL'S REPORT.

"KAMLOOPS, January 20th, 1886.

"SIR,—I have the honour to inform you that after the Deputy Provincial Secretary's exhaustive report on the Granite Creek and other mines in the Similkameen District, little remains for me to add to the information already made public by that gentleman.

"The more recent discoveries are situated north of Granite Creek, head in the same range of mountains, and empty into the Tulameen River. They are respectively named Hines, Slate, and Champion Creeks. Although very little work had been done on them to determine the extent of their richness, sufficient evidence was obtained to prove that they contain gold in paying quantities. Recently prospects have been found on Slate Creek which lead me to consider it the richest gold-bearing stream at present known in the Province. The gravel, from the surface to bed-rock, averages, I am told, from two to six bits to the pan. The depth is from six to eight feet, which increases towards the mouth, and claims remote from its source will, probably, have to be drifted. This creek is twelve (12) miles long, and it has been staked off throughout its whole length.

"In addition to the foregoing, the prospects obtained on the Similkameen and Tulameen Rivers, and other localities upon which little or no work has been accomplished, leave no doubt as to the extent and permanent character of the mines in this district. Taking into consideration the fact that Champion Creek is about twenty miles distant from Granite Creek, and that the latter is apparently in the centre of a large scope of mining country, as yet untouched by pick or shovel, it is difficult to predict what discoveries will be made during the coming summer, when every creek and gulch within a radius of many miles will be actively explored for its concealed wealth.

"The climate is mild, and work can be prosecuted for a much longer period during the year than in the northern mining camps of the Province. Snow falls to a depth of three or four feet and supplies an abundance of water for all purposes during the summer.

"In regard to the yield of gold for the past season, I may add that Granite Creek, notwithstanding many drawbacks from dams being swept away by freshets, and with a comparatively small number of men, is credited with having produced $90,000. In the absence of any reliable data it would be impossible to state what amount—which must be considerable—was procured by whites and Chinese in other localities. The gold is coarse, and readily commands $17 per ounce. The largest nugget was found by a Chinaman on the Similkameen River, and weighed $87.50.

"The Government has reserved 160 acres of land on the Tulameen River, at Six-Mile Flat, in the vicinity of Otter Lake, for a townsite, which will be an important centre should the mines in the neighbourhood turn out as expected.

"The town of Granite Creek has about forty houses, to which a large addition will be made before spring, in anticipation of the large influx of miners, who will flock thither from different portions of British Columbia, and from the adjoining American territories and Pacific States. There are at present six saloons and hotels, and seven or eight stores well supplied with dry goods and groceries, which are disposed off at very moderate prices.

"The cost of lumber—$80 per 1,000 feet—has greatly interfered with building, but a saw-mill will be erected this winter which will suppy the demand at a reasonable rate.

"I may mention that two quartz ledges have been found, which exhibit gold to the naked eye, and promise to become remunerative investments. The assays from the famous Stevenson silver mine, situated 25 miles from Granite, exhibit wonderful richness.

"The Granite Creek mines are reached by three different routes—one *via* Hope, on the Fraser, a distance of 75 miles, and by the C. P. R. from Kamloops and Spence's Bridge, a distance of 50 miles, to Quilchanna and Coutlie's by the waggon road running through the Nicola Valley, thence 60 miles by trail to the mines. The route from the last two points to Richardson's passes through a lovely country, covered with grass, and sparsely dotted with fir and pine trees. Further on it becomes more densely timbered and mountainous, but affords no obstacle to the cheap construction of a waggon road which, for a distance of thirty-five miles, can be built with, comparatively speaking, little expense.

"I have, &c.,
(Signed) "G. C. TUNSTALL,
"*Gold Commissioner.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

Kamloops Division.

MR. DODD'S REPORT.

"KAMLOOPS, January 23rd, 1886.

"SIR,—I have the honour to inform you that the mining interests in the Kamloops division of Yale District are looking brighter than for many years past. Two companies working on Scotch Creek, which empties into Big Shuswap Lake, at a point about 52 miles east of Kamloops, have averaged about wages during the past summer on a bar about ten miles from its mouth. The gold is in coarse pellets and nuggets, and is found in spots in the bars and creek. But there seems to be no continuous lead, and the opinion is now expressed that the gold comes from a channel situated at a higher level in the hill. This theory seems very probable. Advantage will be taken to test this in the spring, and if found to be correct, a new mining district of importance will be developed. About twenty white men will winter on the creek, and between fifty and sixty Chinese.

"The Zeran Mining Company has run a tunnel for a considerable distance on a quartz lode, located about eight miles from the mouth of the creek, from which satisfactory assays have been obtained. It is the intention of this company to actively prosecute operations next summer.

"The Nicola Milling-Mining Company, at Stump Lake, have driven their tunnel about 70 feet, with a working force of eighteen men. Some of the assays from the ore attained as high as several hundred dollars to the ton, and great interest is felt in the development of what will probably prove a valuable mining property.

"I have, &c.,
(Signed) "WM. DODD,
"*Government Agent.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

Hope, Yale and Lytton Divisions.

MR. HUSSEY'S REPORT.

"GOVERNMENT OFFICE, SPENCE'S BRIDGE,
"30th November, 1885.

"SIR,—I have the honour to forward the mining statistics for 1885, and beg leave to submit the following information in reference to the past season at the Hope, Yale and Lytton Polling Divisions of Yale District. Mining matters in the Hope Division have been principally confined to Chinese working on the banks of the Fraser River, and from enquiries I find that but few have earned beyond a living.

"Messrs. Lansing and Beebee have taken up bar claims opposite the town of Yale, and have put up flumes, but have not yet commenced to wash the dirt.

"Mr. William Teague has resumed operations in the Queen Silver Mine, and has engaged the services of four experienced miners. Operations are progressing favourably, and the lode, as seen from the winze sunk about fifteen feet from the surface, presents congenial indications, carrying quartz of a fine character. The general geological formation is mica slate. The following encouraging report has been received by Mr. Teague respecting some rock recently sent to J. H. Collier, Esq., F. G. S., London, England, for assay. In the course of his remarks Mr. Collier says:—'The mineral sent by you for assay, taken as a whole, contains 14 ounces, '17 dwts. of silver per ton, with traces of gold, and no less than 52 per cent. silicious gangue. 'The sample was too small to allow of my determining in which mineral the silver was present, 'probably it might be found in all the sulphides. If these could be concentrated without the 'use of water a valuable argentiferous product would be the result. I should advise further 'exploration on so promising a vein.'

"Between Yale and Lytton there is considerable mining along the banks of the Fraser River, and there are several claims recorded by Chinese, but it is difficult to ascertain the amount of gold obtained. I should judge that the daily earnings of each man so employed would vary from 75 cents to $3 per diem. At Lytton and vicinity there has been this year more than the usual number of Chinese engaged in gold mining, and from reliable sources I have learned that the amount of gold exchanged at Lytton is about $15,000. The returns, as closely as can, with any accuracy, be obtained, are as follows:—

Yale and Hope	$ 4,000 00
Boston Bar	2,000 00
Lytton	15,000 00
Unaccounted for	8,000 00
Total estimated yield for 1885	$29,000 00

"I have, &c.,
(Signed) "FREDERICK HUSSEY,
"*Government Agent.*

"*The Hon. the Minister of Mines,*
"*Victoria.*"

KOOTENAY.

MR. VOWELL'S REPORT.

"DONALD, KOOTENAY, B. C.,
"December 31st, 1885.

"SIR.—I have the honour to forward the general annual report upon my district for the year ending 31st December, 1885, as well as the mining statistics, which I enclose herewith, for the same period.

"That the latter should be accurate in every detail, no effort was spared that could lead to such a result.

"There has been a slight increase in the general output for this year over that of 1884, which is in itself encouraging, and promises favourably for the future as regards the placer mines in this district.

"The returns are as follows, viz.:—

Wild Horse Creek	$30,050 00
Bull River	5,100 00
Moyea River	6,900 00
Palmer's Bar	4,700 00
Weaver, Nigger and Perry Creeks	8,500 00
Findlay Creek	3,600 00
Dutch, Toby and Cañon Creeks	7,800 00
Desultory	10,000 00
Total	$76,650 00

"Owing to an excitement arising last spring a great many of the Chinese, hitherto engaged in mining on Wild Horse Creek, decamped to Findlay Creek. That departure lessened the output from Wild Horse Creek, and unfavourably affected the general returns, owing to the utter failure of Findlay Creek, as regards shallow diggings.

"Those Chinamen who went to the latter creek found promising prospects upon the rim-rock in several places, and during high water, which lasted nearly all through the season, erected substantial buildings, intended for permanent occupation, and busied themselves in sawing lumber and getting out timbers for wing-dams and machinery, etc., at a considerable amount of expense and labour. Several wing-dams were subsequently washed away by fall freshets, which followed immediately upon the cessation of those of spring and summer, and when the miners, late in the fall, were enabled to thoroughly test the creek they found that the bed-rock was hard and smooth, sure indications of the absence of gold, which proved too generally to be the case. Among other unfavourable results, the Chinamen who placed their faith in Findlay Creek were reduced to beggary, in many cases being without the barest necessaries of existence, or the means of paying for the supplies they had procured during the season.

"There is, however, a prospect of the upper portion of that creek, which is some 30 miles in length, proving of importance as a field for extensive mining operations. The benches have been found to contain gold in small quantities, and it is believed that with hydraulic power they can be worked to advantage and profitably. A large amount of capital will first have to be expended, which is at present ready if the company wishing to carry on that enterprise can obtain sufficient ground to justify the necessary outlay. The ground in question is of no value to the individual 'Free Miner,' and cannot, I consider, be better disposed of than by granting a portion of it to some such company as the above.

"Findlay creek is situated about 40 miles north of Wild Horse Creek, and empties into the Kootenay River on the west side, about half a mile below the upper crossing.

"Mining has been carried on upon the Moyea River for many years with varied results, but never extensively. A company of miners discovered late last fall good prospects in the hills (composed of gravel) which, it is hoped, may lead to something extensive and of importance.

"Palmer's Bar has also been the scene of much hopeful labour in pursuit of the precious metal during the past, but never with very favourable results. There are a few of the old hands who yet expect rich discoveries in that locality.

"The same may be said of Weaver, Nigger and Perry Creeks.

"Of Dutch, Toby and Cañon Creeks the only one deserving particular mention is Toby Creek. Gold was discovered in it some time last August, and before the approaching winter froze them out there were some twenty men mining upon it. As far as is known it promises from $3 to $6 per day to the hand. Bed-rock has not yet been struck by any of the companies; ten feet being the lowest depth arrived at up to close of season. The creek is about 28 miles long, flowing from west to east, and emptying into Columbia River a short distance below the Lower Columbia Lake, in the vicinity of Windermere.

"The returns as above will be found to be from that portion of the district lying east and south of the Selkirk Mountains.

"Quartz mining throughout the district has advanced but little materially since 1884. For the most part the claims are merely held by the observance of those provisions in the Mineral Act bearing upon representation.

"The Pioneer Mining Co., Otter Tail Creek, situated about 28 miles east of Golden City, and close to the C. P. R. track, is a pleasing exception to the above. That company has erected a saw-mill, has the plant for a ten-stamp quartz mill upon the ground to be placed in

position next spring, when it is also intended to have a smelter constructed. They have about 35 men engaged this winter in getting out ore and timbers. About April next operations on a large scale will have fully commenced with fair prospects of success. The ore is argentiferous galena; there is a large body of it, assaying from 10 to 180 ounces of silver to the ton.

"On the Spallumcheen there is also one company, the Homestake, sinking during the winter.

"As has been stated in a previous report, there is a great abundance of galena ore in that locality, but of low grade. The company now at work expect that as they get into the mountain the rock will improve. They have had indications favourable to such a supposition.

"Kootenay Lake developments have been insignificant, a result that has caused much disappointment in consequence of its having been publicly stated last year by members of some of the large and moneyed companies that in 1885 operations would be commenced with vigour and extensively.

"The mines referred to have been held by large companies having a command of capital, and by impecunious miners. The former, for reasons best known to themselves, have done but little more than the law imposes upon those not wishing to forfeit their claims. The latter, not having the means to continue their representation, have in many cases abandoned their locations.

"The following are the only companies that have attempted to do anything more than mere representation, viz.:—

"The Tenderfoot and New Jerusalem have each sunk 30 feet, exhibiting a fine body of ore. The Blue Bell Mine sunk about 25 feet—ore taken out considered of inferior quality.

"The Ella, Emma and Munster, in about 20 feet, with encouraging prospects. The Bray's also looks well. There is little doubt, however, in reference to the ultimate success of these mines when properly taken in hand by men earnest in their desire, and of means sufficient to develop that wealth of which indications have already been discovered

"I may mention that the Kootenay Milling and Smelting Company have placed two steamers upon the Kootenay River and Lake, one of them being about fifty feet in length, having powerful machinery, which the company intend to use as a tug-boat for the transportation of ore, in scows made for that purpose, from the different mines. Last fall that company also engaged the services of a mining engineer and assayer who has had three years' experience in the working of galena mines in Germany. He was to spend some three months at the mines, and to report fully upon them. The result I have not yet learned.

"In the Big Bend section of this district there have been during the year, as I have been informed by the Acting Recorder, Mr. Barratt, when visiting McCulloch's Creek last October, about 60 prospectors from time to time ranging through the mountains and creeks.

"About 20 ledges have been recorded, those from which assays have been made showing good returns.

"The Grew Mine gives $1,000 in gold and $30 in silver to the ton. The Amazon, the largest ledge yet discovered, being about 10 feet wide, contains gold-bearing quartz, free milling, and gives good returns from specimens crushed in a crude state by the miners.

"At the time of my visit no returns had been received from the rock from the Barratt Mine sent for assay.

"Three tunnel claims have been taken up on McCulloch's Creek, above the falls. They are in ground which has never been bottomed in early days, although attempts have been made to do so, which, however, were discontinued on account of the great expense then attending the undertaking, everything in the way of mining supplies being at that time at famine prices.

"One of the tunnel companies, the Bald Head, is running a tunnel this winter, having six men employed. They expect to strike bed-rock in April next. Should the prospects be favourable other claims will be immediately taken up and work commenced upon them, there being nearly a mile of new ground yet vacant. There is also a company organized for the construction of a bed-rock flume.

"French Creek has attracted some little attention; several companies have been formed and mining ground in different places taken up upon it; a Bed-Rock Flume charter has also been applied for on that creek.

"From 12 to 20 men are wintering in that section.

* * * * * *

"That no arrangement has as yet been arrived at in reference to the misunderstanding existing between the two Governments relative to precious metals within the Railway Belt, has

retarded the development of that portion of the district. The miners dread nothing more than a law-suit; and consequently many of our best men hang back till the final adjustment of that very vexatious dispute.

* * * * * *

"About 22 land pre-emptions have been taken up in the Upper Kootenay and Columbia River Valley, and one in the Big Bend country.

"I have been informed on good authority that several families propose leaving the North-West Territories next spring for the purpose of taking up homesteads in this district.

"Several applications have been made in reference to the purchase of land within the Railway Belt, none of which could be entertained in consequence of no arrangement having been made by which these lands become open to settlement.

"Provisions are neither plentiful, of superior quality, nor at any fixed price, owing to the uncertainty prevailing as regards the transportation of supplies, which is entirely governed by the caprice of the C. P. R. Co., who operate without any fixed schedule as to rates, etc. Prices prevailing are consequently higher than the people expected, with every prospect of an upward tendency as the new year advances.

"The crops and cattle throughout the district have given very encouraging returns.

"The weather for the last 12 months has been remarkably fine, and the condition of the men employed along the C. P. R. line unusually healthy.

"There were about seven thousand men employed upon railway works, and, including Chinese, about four hundred and fifty engaged in mining and prospecting, etc.

"The number of men wintering west of the Selkirks aggregate about 500; those east, about 350.

"It is expected that about two thousand men will be employed by the C. P. C. Co. next year.

* * * * * *

"Up to the present time there has been no violation of the law nor breaches of the peace east of the Selkirk summit this winter.

"About April next an engine and train is expected to arrive from the east, at which time operations will regularly commence for the season.

"Mails we have none, and the express, carried by dog-train, is a failure. Those attempting to run it being, I understand, about to give it up.

"In attending to the various duties devolving upon me as Gold Commissioner and Stipendiary Magistrate in charge of this district, everything that could be done was done to the best of my ability. I was kept, with great discomfort to myself, constantly travelling through a country where camping out was unavoidable; also being greatly pressed for time I was forced to travel in all kinds of weather, the exposure undergone (happily at the end of the season) resulting in my now being an invalid and confined to my room, which has been the case for the last three weeks.

"The returns of revenue collected, I hope, will prove satisfactory, the vigilance maintained upon all points affecting its collection being never for a moment permitted to relax.

"Mr. Redgrave was most assiduous, and did everything that was possible in fulfilling the duties allotted to him.

"There being no doctor nearer than Farwell in the west, and Calgary in the east, makes the inhabitants feel rather uneasy, as amongst so many people the services of a medical adviser may at any time become of the most vital importance.

"I have, etc.,

(Signed) "A. W. VOWELL,

"*Gold Commissioner and Stipendiary Magistrate.*

"*To the Hon. the Minister of Mines,*

"*Victoria.*"

MR. SPROAT'S REPORT.

"FARWELL, 8th February, 1886.

"SIR,—There being rumours here of excellent assay returns of Big Bend ore, I have inquired and find the *facts*, so far, to be as follow:—

"*Big Bend.*

"*One ton* sample showing no visible gold -New York assay—telegram to say: 'Result good. The particulars will be sent.' These have not yet arrived, but as the telegrapher had high hopes, his friends believe the result certainly must be over $100, or he would not call it good.

"The particulars of another *ton* sample sent by others to New York have not yet come.

"A *small* sample yielded the large quantity of 43¾ *ounces* gold, at that rate per ton, Am.

"A small sample yielded a fraction under $80 per ton, of silver.

"*Illecillewaut—North Fork.*

"A small sample from the Moberly mine assayed $86 to the ton, Am.

"It has been remarked as strange that the railway has not cut through any likely ore anywhere in this district, but a prospector the other day showed me an assay from Colville of $49 to the ton, of a small portion of blackish decomposed rock, found to contain silver. He says that on the road-bed of the railway there is an immense mass of this rock blasted to form an embankment, and ready for shipment. He has gone to stake it for a mining company, and must believe in it to come from Colville and ascend the Selkirks at this season; but I know no more about it than is above stated.

"If the Dominion contention as to the minerals be sustained, the road-bed minerals will belong to the C. P. R. Co.

"The hopefulness of the people here in the mining region has not diminished, and I notice some improvements in town.

"I am, &c.,
(Signed) "G. M. SPROAT.

"*The Honourable the Minister of Mines,*
"*Victoria.*"

NORTH-WEST COAST.

MAJOR DOWNIE'S REPORT.

"VICTORIA, B. C., 8th October, 1885.

"SIR,—I have the honour to submit to you the result of my last prospecting trip on the mainland coast of British Columbia.

"I shipped per steamer from Victoria to Bella Bella, and at that place took on board two Indians and canoe for Kitamaht. Left the steamer at mouth of Pender Channel, and proceeded by canoe to the head of the inlet, where the formation changes east of the Granite Range to slate trap and porphyry. Camped at the head of the inlet, and afterwards went to the old ledge which I have located and re-located for the last twenty-five years. This ledge is a true fissure vein, with well-defined walls of porphyry on the east and slate on the west. The vein is about six feet wide and consists of free milling ore, assaying by fire process $29 in silver and $9 in gold to the ton. There is a large stream of water in close proximity to the ledge, suitable for milling purposes and reducing works, with abundance of timber on the ground. This ledge is situate half a mile from the water, in a fine sheltered cove, and can be worked all seasons of the year to advantage.

"This part of the country has the appearance of being a valuable mineral region, and differs completely from the hard granite range south of this location. Lorne Creek, on the Skeena, lies about fifty miles north-west of this formation; and although the result of this season's work has not been very satisfactory in the Skeena, still, from the fact that gold is found in paying quantities in this slate belt, there is every reason for supposing it to be a valuable mineral country, when further prospected and developed. Prospecting will also be carried on north-west of this, towards the head of Observatory Inlet, east of the coast range to the head-waters of the Stickeen.

"Several creeks have been discovered lately by prospecting parties from Stickeen, and favourable results may be looked for shortly.

"I have done considerable prospecting in an inlet named Killdalla, near the head of Kitamaht, and found silver and copper.

"The presence of large mica boulders along the base of the mountains denotes that mica may be found in abundance. Graphite and molybdenum also exist in this inlet.

"In a bay about sixteen or seventeen miles south of the entrance to Pender Channel I found galena ore, but was prevented by stormy weather from going up the mountain and examining the location more minutely.

"I explored High Hite for several days, in the hope of discovering something valuable, as I had previously found rosam tin float up this inlet some fourteen years ago, but found nothing of any value on this occasion.

"I left for Dean's Inlet and went up the Ihtite Inlet, where I, with others, took out 70 tons of graphite in 1860, and shipped it to England in the 'Princess Royal;' but nothing came of that venture.

"It is twenty-seven years since I first made a report to Sir James Douglas, and although I still like to explore, I regret to say that old age will not let me climb the mountains any longer.

"In conclusion, I wish to state that twenty miles below the head of Kitamaht a river comes in from the north side. Black sand and quartz gravel at the mouth indicate mineral.

"I herewith present you with specimens of gold and silver ore, graphite, molybdenum, and mica.

"I have, &c.,
(Signed) "WILLIAM DOWNIE.

"*To the Hon. John Robson,*
"*Minister of Mines, &c.*"

COAL.

The following table shows the output of each year from 1874 to 1885, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070
1885	365,000

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.,
"27th January, 1886.

"SIR,—I have the honour, in pursuance of the 'Coal Mines Regulation Act, 1877,' to respectfully submit for consideration my annual report as Inspector of Mines, for the year closing on the 31st December, 1885.

"The collieries which have been in operation in the year 1885, are as follows:—

'Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.

"Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons.

"East Wellington Colliery, owned by R. D. Chandler, Esq., of San Francisco.

"Alexandra Colliery, of the Esquimalt and Nanaimo Railway Company.

"The output of coal for the year amounted to 365,596 tons, which, added to 2,034 tons in stock at the commencement of the year, formed a total of 367,630 tons of coal for disposal. The exports in 1885 were 237,797 tons shipped to California; Portland, Oregon; Alaska, and the Hawaiian Islands; and supplied to mail steamers and other vessels calling.

"The local consumption in 1885 is returned at 95,227 tons, which is nearly 8,000 tons more than that of 1884.

"In comparing the extent of our coal mining and commerce of 1885, with the results in the year 1884, I regret to have to note a decrease both in output and exports. The output is 28,473 tons less than the output of 1884, and the exports are 68,680 tons less than those of 1884. This falling off, however, has not been caused by any decline of power or resources on the part of our collieries. On the contrary, the collieries of British Columbia have at present an aggregate capacity equal to the production of coal of the best quality, sufficient in quantity to supply the demands of San Francisco and our other usual markets, without those consumers being obliged to have recourse to Great Britain or Australia for supplies; but during the past year larger quantities than ever of Australian and British coal have been poured into San Francisco, which has had the effect of glutting the market and causing a diminution of the demand from our collieries.

"I trust that a measure of reciprocity may be accomplished between Canada and the United States by the Dominion Government, and brought to the aid of our coal industry, so that we may have the advantage, now so much needed, of 75 cents a ton over British and Australian shippers of coal; or at least it is to be hoped that the latter will see that shipping coal to San Francisco regardless, apparently, of the cost of production, freight and handling, will only result in demoralizing the market, without yielding them any profitable return, as our collieries will doubtless retain their old time customers by the keenest competition that may be necessary.

"The following statement, obtained from a reliable commercial source, will show the receipts of coal at San Francisco, and Wilmington in California, for the past three years, and also the places from which the supplies were derived:—

	1883. Tons.	1884. Tons.	1885. Tons.
British Columbia	128,503	291,546	224,298
Australia	174,143	190,497	206,751
England and Wales	131,355	108,808	170,656
Scotland	21,942	21,143	20,228
Eastern States (Anthracite &c.)	43,861	38,124	29,834
Seattle	139,600	125,000	75,112
Carbon Hill	140,135	122,060	157,241
Green River and Mount Diablo	76,162	77,485	71,615
Renton, Newport and South Prairie	43,600	60,413	67,604
	899,301	1,035,076	1,023,339

"It will have been observed that we began the year 1886 with the unusually large stock of 34,210 tons of coal in bin or bunkers at the collieries, or at the wharves ready for shipment.

"NANAIMO COLLIERY.

"DOUGLAS PIT.

"In this mine, which is owned by the Vancouver Coal Mining and Land Company, Limited, there has not been any mining done during the past year, but the Company continue pumping the water from the pit, and also from a slope in connection with it.

"NEW DOUGLAS (OR CHASE RIVER) MINE.

"This mine is also owned by the Vancouver Coal Company. There has been considerable idle time in this mine during the past year, not owing to any accident, but on account of dullness in trade. You will have seen, in a previous report, that the mining lately done here was from a slant or slope. The coal is very good, but of late the Company have been much troubled with water, so much so, that from the beginning of December, the water came in so fast that

they were obliged to take the pumping machinery and rails out from the lower workings. Now the pillars are being taken out from the upper workings, while the water is fast rising.

"Ventilation was good on the intake in the counter-level the last time I was down there; 8,860 cubic feet of air per minute for the use of twenty-two men; part of this escaped when coming along the stalls on the return.

"This mine has been a very difficult one to work, on account of one fault after another, besides being greatly troubled with water.

"No. 1 Shaft, Esplanade, Nanaimo.

"This mine is what is known as the Vancouver Coal Company's No. 1 Pit. Everything about this mine, both on the surface and at the bottom of the shaft into the top of the slope, is of the strongest nature, the roof being supported by caps 15 inches square, with posts of the same dimensions. At the top of the slope (underground) they have now working a pair of 16-inch cylinder engines to hoist the coal, etc., out of the slope; these engines are furnished with steam from the same eight boilers which supply steam to the large hoisting engine on top.

"From the bottom of No. 1 Shaft, there is only one level working, known as No. 1 North level. The face of this place is now 1,100 yards in from the shaft. There has been a large quantity of coal mined from this level, and if the ground which has been gone through had been all good, this of itself would have made an extensive mine, but a great part of it has proved faulty, with wants, soft coal and otherwise.

"The slope in this mine is now down about 700 yards with a gentle grade. There are two levels working from the slope, one on either side; one is known as No. 2 North. This place is now in about 600 yards, with a long face of good hard coal in sight, varying in thickness from 4 to 8 feet. The level on the other side is known as No. 3 South. In this place for the first 250 yards the coal was poor, when they struck good coal about 7 feet thick, and by what they have seen, they can count upon good thick coal here for a long time. From this level to the bottom of the slope the coal is not good, and what there is is soft, and at the face there is very little coal; but as they have crossed the same want both in the No. 1 and No. 2 North levels, they know about the distance they have to go before they strike good coal, which will be the same body they are now working from No. 2 North level, and they expect to get into this body of coal soon in the slope. This slope, from the start, runs direct under the estuary of Nanaimo Harbour for the whole length of 700 yards, at a vertical depth of near 800 feet below tide water, with all the rock gone through in the shaft intervening, and what other rock or ground that may come on when going to the dip. Nearly all the work done in this mine is under the tide waters of Nanaimo Harbour, yet with all that the mine is very dry; hardly any water comes in, and what does come is free from salt. I think there is not much danger from water from the sea, with the ample cover over-head.

"Ventilation is good; the motive power is a jet of steam discharging in the return air shaft. The engine at the head of the slope also discharges its exhaust into the upcast shaft. When I was down in December, there was 32,000 cubic feet of air travelling per minute for the use of 50 men. The ventilation is upon the separate split system, with the main divisions from the slope, taking the counter-levels for the intake, the main and counter-levels going parallel with each other, only a few yards intevening, and being cut through at stated distances, so that the body of the air is always kept well in, and then returns by way of the stalls. Ventilation being good, there is very little gas found in the mine. Coal, etc., is hoisted from No. 1 Shaft by a pair of powerful engines, made by Oliver & Co., Chesterfield, England (described in a former report). All about the pit-head is housed in to protect the workmen from the weather. During the past year, additional shutes have been erected for greater convenience and expedition in getting away the coal, etc.; in fact all the work about the pit-head is done in good style. Plenty of timber and other things necessary for the works are on hand.

"South Field Mine.

"The mine designated by this name in a previous report was discontinued early in the year, and the New Slope, mentioned in the same report, is now known as the South Field Mine, and is belonging to the Vancouver Coal Company. The slope is now down 600 yards, with the coal varying in thickness from four to ten feet. The coal is of a very good quality. There are three levels working from this slope in an easterly direction, but at the present time

there are none working on the west side. Where the coal is hard and good, here, as in the old South Field Mine, there is much ground gone through that will not be profitable to work. The place where the coal should be is regular, but the coal is not there—only soft black coal matter.

"Ventilation is good, the motive power being a steam jet in the return air shaft. The last time I was in the mine there was 12,400 cubic feet of air per minute for the use of fifty men. The air is well conducted into the face by brattice, which, being so close, often gets broken down during blasting. With all the faults and wants which have been met, this is a good mine. They have very little water to contend with.

"In addition to the large pair of winding engines on the surface, there is another engine in the mine to hoist the coal, &c., from the bottom to the point from which the large engines take it away to the surface. This arrangement furthers the work at the bottom, and prevents any delay that might otherwise have been occasioned to the engines on top.

"WELLINGTON COLLIERY.

"WELLINGTON MINE.

"This is a slope mentioned in a previous report, and belongs to Messrs. Robert Dunsmuir & Sons. In this mine, as in all the other mines in this colliery, there has been considerable idle time for want of ships to take the coal away. The mining here has been confined to the working out the pillars (of coal) during the past year, and that at the lower levels; and as they have got most of the coal out of those places, they have now started on the upper levels to also take the pillars out, and what coal can be got along the crop-out, which will last for quite a time yet. Owing to the taking out of the pillars and the roof coming down, this mine has lost connection with two of their shafts or outlets, but there are yet three connections with the workings and the surface. Ventilation is good, the motive power being a large furnace. The ventilation is on the separate split system, with the main divisions to each side of the slope, the air going in the levels and returning by the way of the pillars or stalls to the up-casts. There is little or no gas now found in this mine, except on some occasions when a cave takes place. The fireman is going round all the time, by night as well as day, to see that no gas collects, and to report to the workmen whether or not the mine is in a safe condition for them to proceed to work.

"In connection with this mine there is the adit level. There has been little or no mining done here for the greater part of the year, as the demand for coal did not justify the owners to work here; but they are about to work again soon, as there is quite a large body of coal to work from in this level.

"Ventilation was good. This place is partly ventilated from the Wellington mine, and partly by a shaft with a large furnace. In any of the above places I never find less than 300 cubic feet of air per minute to each man.

"No. 3 PIT, WELLINGTON COLLIERY.

"This is the only shaft which Messrs. Dunsmuir & Sons have working in the valley of the Millstone River. There has been very little mining done here during the year that is past. In my previous report mention is made of the No. 4 pit being on fire; and as the workings of those pits are connected, forming one body of workings, the fire referred to being of such a large and serious nature, they had to turn in the water from the Millstone River to this mine, it being the lowest, and the water had to flow in here and fill this place before it could be got to the fire in No 4. Now they have got the water out, but there is considerable damage done to some parts of the workings. They are, however, getting the workings in good order again. When I was down in December there were seventeen men working. Ventilation was very good (motive power, a fan), as there was 45,000 cubic feet of air per minute in circulation.

"No. 4 PIT, WELLINGTON COLLIERY.

"You will see by a former report that this is the shaft owned by Messrs. Dunsmuir & Sons which overlooks the valley. Mining has not been carried on very extensively here during the past year, partly owing to the fire in the mine, which started on the 30th December, 1884, and, as you will have already seen, the mine had to be filled with water for about forty-three feet up the shaft from the coal, so that they would make sure of extinguishing the

fire, the water having to be run into the No. 3 pit. After they had got sufficient water in, it was allowed to stand for some time before pumping was started; then everything went on favourably until the 20th April, when I went down the shaft along with Mr. Bryden, manager, and Mr. Scott, overman, and Mr. Little, engineer. The water was then two feet on the bottom. We went in the north side about thirty yards, when we could see the effects of the fire. Timbers that had been one foot thick were burned out, and the sides of the pillars burned and charred, while the roof was down from the height of about twenty feet above the coal. We also went in the south side, but here there was nothing to show that there had been a fire in the mine; there was, however, a cave from the roof. On the 30th of April Mr. Bryden sent a man to tell me that the upper part of the mine was dry, and that they had seen the bodies of the two men who were lost there on the 30th December, 1884, viz., John Paul and a Chinaman. I went to the mine and went down. As the bodies were on the north side, and that was heavily caved, we had to go in the south side and through the old workings to get to the bodies. They were both lying together, about 100 yards from the face where they had been working. After much work they were got to the surface. (*See* inquest, 30th April, 1885). From that time they commenced to clean up the mine to get it in order. After it was put in order, they started a few miners to put out coal; but as demand was not then, nor has since been, pressing, they have not put on such force as was at work before the fire.

"Ventilation is very good, and on the separate split system, the split being at the bottom of the shaft to the north and south sides of the shaft. There is never less than 400 cubic feet of air to each person per minute. In one month they expect to be connected with the No. 6 pit. Coal is from seven to ten feet thick, and of the usual good quality of the Wellington coal.

"No. 5 Pit, Wellington Colliery.

"This mine is also mentioned in a previous report. In this pit there has also been some idle time; not on account of any accident, but owing to the coal trade being dull. At one time the coal here did not look as well as they would have liked it to do, but after a time it began to improve, and now they have a good mine and a valuable property. Here they have worked on the pillar and stall system, as all the other mines belonging to Messrs. Dunsmuir & Sons are worked.

"Ventilation is good; motive power, a steam jet. This mine is also ventilated on the separate split system, with the main division at the shaft going in the level on either side. The last time I was at this mine there was 17,200 cubic feet of air per minute, for the use of forty-five men. This mine is almost free from gas. They are now sinking a shaft about eighty yards to the south of this pit, and are down about eighty feet. This shaft will be used as an air shaft for this mine.

"No. 6 Pit, Wellington Colliery.

"This pit is the sinking shaft mentioned in a previous report. Messrs. Dunsmuir & Sons have struck the coal at the depth of 260 feet from the surface. The coal was nine feet thick, hard, and of the usual good quality. They drifted into the coal about 100 yards, towards No. 4 pit, when they stopped work; and now, as I have said, they expect to get connected from No. 4 with this place in about a month.

"ALEXANDRA COLLIERY.

"This is what I mentioned in the 1884 report as a new Colliery being started in Cranberry District and owned by the Esquimalt and Nanaimo Railway Company. I am sorry to say that the coal at this place has not proved to be very good, or what it was expected to be. They put a slope down about 600 yards, which showed the coal not to be regular, but what they did get was of good quality; yet there are some places in this slope where the coal is hard and thick. They also did considerable work at some other places, but at present all work is stopped. It is to be hoped that there will yet be much good coal got at this place.

"EAST WELLINGTON COLLIERY.

"In my report of 1883 I stated that they had mined up the valley about 500 yards with side drives, but that the coal was thin. Since that time they have kept vigorously to work, not sparing any expense to find good coal, if there is any in the ground.

"The above level is now 1,100 yards in from the shaft where it now stands. Before this place was stopped there was a fault got crossing the level, which put the coal 34 feet above the level, but they went up after it. Here the thickness of the coal varied from 5 to 6 feet, hard and good. For quite a long distance before this fault was got the coal would average about 2 ft. 6 in. thick. They thought this part would be profitable to work by what is known as the long-wall system, and they have worked at that since September, and it mines as well as could be expected, taking the rock from the roof in the roadway and building it in the waste work, as well as the refuse from the mining of the coal, which fills it well up, not allowing it to settle far. They are also working to get a good roadway up over the above mentioned fault.

"At present they are sending out 100 tons of good coal per day, with the prospect of greatly increasing that soon. It is to be hoped that there will yet be a good mine here.

"Ventilation is good, motive power being a furnace. The last time I was down there was 7,400 cubic feet of air per minute travelling for the use of 24 men; air going in the level, returning by the faces. As there are no pillars (coal), the air has a clear way along the face. There is little or no gas seen in this mine. The fireman examines it regularly; I could see his mark for the day I was down, as it has to be in figures. There is always plenty of timber of all kinds, and of various lengths, to suit the different places.

"GENERALLY.

"All the above mentioned works I have frequently inspected during the past year. I found them generally in good order with plenty of timber, and other things necessary for the use of the workmen provided. In the course of my inspections of several of the mines, I have drawn attention to some things which I thought necessary to be done, and my requests have been attended to at once. Sometimes the brattice was not as close as 9 feet to the face, but then they showed me that it was hardly possible to keep it so close when there is so much heavy blasting as there is in the mines in this district. In places giving off gas, they have got to have it within a few feet of the face; but gas or no gas, the brattice has got to be kept 9 feet or thereabouts from the face. Some of the miners tell me that they do not want it so close, yet the brattice-man puts it up; but it is often broken down, having to be put up three or four times before it can be got to stand, which, of course, the miners cannot help.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES OF BRITISH COLUMBIA FOR THE YEAR 1885.

"6th January—Ah Ying, labourer in the employment of the Vancouver Coal Company, had his leg broken while shunting cars on the railway by being jammed between the said cars.

"The above Ah Ying died on the evening of 6th instant.

"9th January—Tang, runner in the Wellington Mine, was jammed between a car and the roof while riding on the top of the cars in the said mine.

"5th February—Robert Shipley was injured by a fall of coal and rock while at work in No. 5 Pit, Wellington Colliery.

"15th April—John Lewis, miner, was hurt about the body by a piece of rock falling on him while at work in No. 1 Pit, belonging to Vancouver Coal Company.

"22nd April—Chinaman No. 208, running coal in New Douglas Mine, got his leg broken by being jammed with the boxes while at work.

"5th May—A. Mallony, miner, working in the Vancouver Coal Company's No. 1 Pit, was injured about the body by a piece of coal falling on him when at work, and died 8th May.

"5th May—James Green, miner, was injured about the body by a piece of coal falling upon him while at work in the Wellington Colliery Slope.

"20th May—John Williams, miner, working in the East Wellington Colliery, was killed by a premature shot.

"23rd May—William Bray and Cadwallader Hughes, miners, were injured while at work clearing up a cave from the roof in No. 4 Pit, Wellington Colliery.

"The above Cad. Hughes died on 8th August.

"30th May—William Dunstone, miner, was seriously injured by a fall of coal and rock while at work in the Wellington Mine.

"30th May—Chinaman No. 164, labourer to Vancouver Coal Company, was slightly hurt about the legs by a railway car.

"6th June—John Curry, overman, and Peter Brennen, foreman of Chinese, were severely burned about the face and hands, and two Chinamen were slightly burned by an explosion of fire damp which had collected in a cave in the Wellington Mine.

"10th June—Robert Spence, miner, working in the Vancouver Coal Company's No. 1 Pit, was hurt about the body by a fall of the top while at work in his stall.

"11th June—Chinaman 193, working in the Vancouver Coal Company's No. 1 Pit, had one of his legs hurt between two boxes.

"22nd June—Chinaman No. 326, running coal, got one of his legs broken by being jammed between two boxes while in No. 1 Pit, belonging to the Vancouver Coal Company.

"25th July—Shoo (Chinaman), was seriously injured by being jammed between two railway cars while at work at Wellington on the railway.

"25th July—Sam (Chinaman) was injured by being jammed by a car in the Wellington Mine while at work.

"4th August—Robert Shipley, miner, was injured by a fall from the roof while at work in No. 5 Pit, Wellington Colliery.

"23rd August—E. Jarman, miner, working in Vancouver Coal Company's South Field Mine, was slightly hurt about the face by coals thrown from a shot.

"25th September—James Hunt, timberman, working in No. 1 Pit of the Vancouver Coal Company, was killed by a rock falling on him while making ready for timber.

"14 October—Ah Hem, Bon You, Len Sing, Wah Shung and Ah Lock were killed by a car falling on them while descending the East Wellington shaft to work.

"20th October—Chinaman 204, running coal in the Vancouver Coal Company's South Field Mine, was jammed about the body with a box while at work.

"24th November—Francis McLean, miner, working in No. 3 Pit, Wellington Colliery, was injured by a fall from the roof.

"26th November—Lon (Chinaman), runner in No. 4 Pit, Wellington Colliery, had his leg broken by a box.

"28th November—J. K. Mardis, miner, was slightly burned about the face and arms by powder from a blast in No. 1 Pit of the Vancouver Coal Company.

"25th November—David Moffat, miner, was seriously hurt about the body by a cave from the roof while at work in the Wellington Mine.

"17th December—Sam Hock (Chinaman), runner, had his leg broken by being jammed with a box while at work in the East Wellington Mine.

"29th December—Ah Sing, labourer, got his leg broken by a piece of rock while at work helping two timbermen to put up timber in No. 1 Pit, belonging to the Vancouver Coal Company.

"I am sorry to have to make a list of so many accidents for the year that has closed, both serious and fatal. Some of them were very slight, yet they were of such a nature that they had to be reported.

"Of the accidents in this list, nine were by cars in the mine; two by cars on the railway; six by falls of coal; seven by falls of rock; three by shots and powder; four by an explosion of gas, and five by a car falling down a shaft while the cage was descending with the men on it going to work.

"On looking over the list of accidents, you will observe that there were ten fatal; one was caused by a car in the mine; one by coal; two by rock; one by shot, and five by a car falling down a shaft.

"I have inquired into all the accidents which have happened, and in the fatal cases, inquests have been publicly held, in which all the evidence was taken that it was possible to get; and in the case of the five men who were killed in the shaft, at about 11 p. m. at the change of shift, as negligence on the pitheadman's part was thought to be the cause of the accident, he was put in prison charged with manslaughter. The examination before the Stipendiary Magistrate, which lasted for quite a few days, was held, but as nothing could be proved to cause any suspicion against him he was discharged. As the depositions and proceedings at the inquests held on the fatal accidents are filed in the Attorney-General's Office, I beg leave to refer you to the same. With the exception of that accident in the shaft, all the fatal accidents took place at the workman's regular place of working, which is under the miner's own care, and he is supposed to be able to judge for himself, and to see when there is

danger, subject, however, to the overman; if that officer should see anything which he thinks dangerous when he is going amongst the workmen, and in their working places, pointing it out to them and having it made safe. There are, however, besides the practical miner, a great many men employed in the mines who never were in a coal mine until they came here; some of them are very careful workmen, but others, while working, do not know when they are in danger. This class help to make up the list of casualties.

"You will also observe that there are four reported as having been burned by an explosion of gas, when I might say that there were only two, as two of the four mentioned barely got warmed. This is very gratifying in comparison with the previous year.

"I hope in the year on which we have now entered, we shall enjoy still greater immunity from accidents, and that every one engaged in the hazardous occupation of coal mining will use the greatest caution, so that, if possible, no list will be required for accidents, as they will have ceased to happen.

"And I trust that the present year will be a prosperous year to the mining industry and workmen in common.

"Appended hereto are the Annual Colliery Returns.

"I have, &c.,

(Signed) "ARCHIBALD DICK,

"*Government Inspector of Mines.*

"*To the Hon. the Minister of Mines,*

"*Victoria.*"

COLLIERY RETURNS.

NANAIMO COLLIERIES.

Output of coal for 12 months ending December 31st, 1885.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1885.	No. of tons unsold, including coal in stock, Jan. 1st, 1886.
138,352 12-20.	26,710 17-20	111,670 7-20	1,048 5-20	1,019 13-20

Number of hands employed.			Wages per day.		
Boys & Indians.	Whites.	Chinese.	Whites.	Chinese.	Boys & Indians.
15	327	208	$2 to $3.50	$1 to $1.25	$1.50

Total hands employed ..... 550 | Miners' earnings, per day.....$3 to $4

Name of Seams or Pits—New Douglas or Chase River, South Field, and No. 1 Shaft.

Value of Plant—$350,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same.—Chase River, worked by slope, seam averaging 6 feet; South Field, worked by slope, seam 6 to 10 feet; No. 1 Shaft, worked by shaft, seam 7 to 10 feet; Douglas Pit not working.

Description and length of tramway, plant, &c.—Railway, Douglas Pit to wharves with sidings, 1⅓ miles; railway, Chase River to wharves with sidings, 2 miles; railway, South Field to wharves with sidings, 3 miles; railway, No 1 Shaft to wharves with sidings, 1 mile. Rails are of steel, 56 pounds per yard of standard 4 feet 8½ inches gauge; 8 hauling and pumping engines; 10 steam pumps; 4 locomotives; 100 coal cars (6 tons), lumber and ballast cars; fitting shops for machinery with turning lathes, boring, screw-cutting machinery, steam hammer, &c., &c.; diamond boring machinery for exploratory work (bores to 2,000 feet); wharves, 750 feet frontage, at which ships of the largest burthen and draught can load at all stages of the tide.

SAMUEL M. ROBINS,
Superintendent of the Vancouver Coal Mining and Land Company, Limited.

WELLINGTON COLLIERIES.

Output of coal for 12 months ending December 31st, 1885.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons. on hand 1st January, 1885.	No. of tons unsold, including coal in stock Jan. 1st, 1886.
220,000	68,340 18-20	120,559.10	586 8-20	31,691

Number of hands employed.			Wages per day.		
Boys.	Whites.	Chinese.	Whites.	Chinese.	Boys.
None.	284	131	$2 to $3.75	$1 to $1.25	

Total hands employed ..... 415 | Miners' earnings, per day .....$3 to $4.50

Name of Seams or Pits—Wellington.

Value of Plant—$250,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—6 to 10 feet thick; 3 shafts working; 1 slope working; 1 adit level working; 3 air shafts; 1 of these with large furnace at bottom; the other two ventilating fans driven by 2 pair of engines; 1 shaft being sunk.

Description and length of tramway, plant, etc.—10 miles railway; 4 locomotives, 200 waggons, 7 stationary engines working, 1 engine not used at present; 4 steam pumps; 5 wharves for loading vessels at bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31st, 1885.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1885.	No. of tons unsold, including coal in stock Jan. 1st, 1886.
7,244	176	5,568	400	1,500

Number of hands employed.			Wages per day.		
Boys.	Whites.	Chinese.	Whites.	Chinese.	Boys.
None.	44	40	$2.50 to $3	$1 to $1.50	

Total hands employed ..... 84 | Miners' earnings, per day .....$2.50 to $5

Name of Seams or Pits—East Wellington.

Value of Plant—$100,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same.—1 seam (irregular); 1 shaft 8x18x240 feet deep; 4 levels, 6x10 feet; 1 slope; 3 slants, 6x12 feet.

Description and length of tramway, plant, &c.—Railroad 3½ feet narrow gauge, 3½ miles long; 2 locomotives, 20 4½-ton coal cars; 1 wharf, 30 feet wide and 725 feet long; 1 steam pile-driver complete; 1 pair hoisting engines; 1 donkey engine; 1 steam saw-mill complete, capacity, 12,000 feet per day.

W. S. CHANDLER.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer, at the Government Printing Office, James' Bay.
1886.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1886,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer
at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1886,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1886.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
1885	594,782	,, 118,956	713,738	2,902	246
1886	753,043	,, 150,608	903,651	3,147	287
			50,289,517		

REPORT

OF THE

MINISTER OF MINES.

1886.

To His Honour CLEMENT FRANCIS CORNWALL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1886, is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,

26th January, 1887.

REPORT.

GOLD.

The value of the Gold exported by the Banks at Victoria during the year 1886, is as follows:—

Bank of British Columbia	$ 374,398
Bank of British North America	48,518
Garesche, Green & Co	330,127
	$753,043

This shows a bank export of nearly $160,000 in excess of 1885, and adding one-fifth as the estimated value of the gold leaving the Province otherwise than through the Victoria banks, gives a total yield of over $903,000 for the past year,—a very substantial and gratifying increase.

The reports of the Gold Commissioners, Cariboo and Lillooet Districts, show that the greatest activity prevails, and the most sanguine hopes are entertained with regard to the profitable working of gold quartz. In fact, information from every source irresistably leads to the conclusion that the era of quartz mining is at hand.

A preliminary report by Mr. Amos Bowman, Mining Engineer, and a report by Mr. Koch, Mining Expert, on ledges examined by them in the Cariboo District, during last summer, are published herewith, and will be read with interest.

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, November 29th, 1886.

"SIR,—I have the honour herewith to submit my twelfth annual report on the mining industry of this district, accompanied by the usual statistics in tabular form.

"In alluvial mining there is but little worthy of mention.

"Another remarkably dry season, with a further decrease in our mining population, has had the effect of further diminishing the annual yield of gold, but the product of the year is, perhaps, not less than in 1885 in proportion to the number engaged and the time consumed in working as, for a considerable portion of the year, quite a number of white men have been engaged upon quartz ledges which are, as yet, non-productive; besides, not a few miners left the district in the spring for Granite Creek mines.

"A number of these, however, have recently returned, who are, probably, the harbingers of more.

"It will be observed from the statistics that there is a decrease in the number of Chinese engaged in mining.

"On Williams Creek and its tributaries the output of gold from the different claims has been nearly equal to that of last year.

"The Forest Rose Company, which yielded largely as a drifting claim in years gone by, and which has been at great expense for the past six or seven years in opening up so as to work as a hydraulic claim, has at last reached bed-rock with their cut, and this season obtained very good pay.

"No doubt but this claim will yield good returns for the next fifteen or twenty years, as they have a large extent of ground

"There are a number of claims in the district similarly situated, but which have not, as yet, their works in a sufficiently advanced stage to reap a reward therefrom. To such companies the past two dry seasons have been particularly disappointing and have caused some of the companies on Grouse and Mosquite Creeks to make surveys, with a view to bringing in water from the adjacent streams by ditches, thereby adding to the natural flow of water on those creeks.

"On Lower Antler Creek there has not been nearly so much mining by the Chinese on the benches as in former years. The deep ground, however, ten miles below Grouse Creek has not yet been proven

"A company of white men sunk a shaft where, years ago, a body of clay was found, but were unable to reach bed-rock, a statum of gravel at a depth of over fifty feet supplying more water than they were able to manage without machinery, and, it being late in the fall, work was suspended.

"The success of one company here would mean the opening of a new mining camp, as there are miles of the creek of similar formation which has never been bottomed.

"The company will, probably, put up machinery in the spring.

"On Upper Antler the Nason Company, from which important developments have been expected in proving the deep ground, has not as yet, I regret to say, succeeded in getting into their claim. The pressure of water is so great that every time they break through into the gravel they are driven out. Each time, however, on clearing up the debris caused by the rush of water they have had satisfactory proof of the existence of gold in such quantities as to encourage them to proceed.

"It is now generally believed that the only way to successfully work the deep ground is by fluming the creek for a considerable distance above and below the shaft.

"This company has decided to put up a saw-mill to cut lumber for a flume, and next year will probably see the problem solved.

"On Cunningham Creek the ubiquitous Chinese made a fortunate strike during the summer in the hill, and a company of four men have been taking out from twenty to fifty dollars per day to the hand.

"Investigation, however, goes to show that the discovery is not of importance, their location being on a point across which the old bed of the creek passed at a much higher level than the present bed of the stream.

"What, after further prospecting, may prove to be an important discovery, was made late in the season about eighty miles to the north-east of Barkerville by Geo. Isaacs, Robert Buchanan, Arthur Johnston, K. McLeod, and N. Wilson

"From persons who had been out in that direction much had been heard of the favourable appearance of the country, and of the presence of gold in some of the creeks.

"Messrs. Isaacs and Buchanan were engaged to blaze a trail to the Fraser, striking that river about one hundred miles below Tête Jaune Cache. These men subsequently associated with the other three men that they might have time to test the ground before returning.

"The result of the expedition has been most satisfactory, and if the report is confirmed by an actual working test, a rush in that direction will take place before another year has passed.

"One of the conditions upon which the men were engaged was that a report should be made giving as accurately as possible a description of the country traversed and of any discoveries of gold, which report is subjoined hereto and speaks for itself.

"These parties will return early in the spring prepared to prove the value of the discoveries made.

"This section of country is entirely disconnected from the present Cariboo mines by a high granite range known as the Cariboo Mountains, the gold being found on the north of these mountains, and a stretch of thirty miles of granite formation intervening before the auriferous slate again makes its appearance.

"This region is most probably the source from which the bars on the Upper Fraser derive their deposits of gold.

"*Yield of Gold.*

"I estimate the gold yield of the district for the year as follows:—

Barkerville Polling Division	$ 96,000
Lightning " "	54,800
Quesnellemouth "	45,500
Keithley Creek "	62,000
Amount from time of collecting statistics to Dec. 31st,	15,000
Amount of which no account was obtainable	15,000
	$288,300

"*Quartz.*

"In this most important branch of our mining industry the developments made by Mr. Bowman, of the Geological Survey, supported by the opinions based upon practical tests of Messrs. Koch and Craib, mining experts from California, have at last, let us hope, resulted in placing the value of our ledges fairly before the public, so that capitalists will no longer hesitate to invest when such promising returns are held out.

"The great depth of alluvial deposits which cover the bed-rock has, no doubt, been one of the primary causes hitherto against the discovery and development of the numerous quartz veins now known to exist throughout the district.

"The question then remains: 'Can these sulphuret veins be worked at such a cost as to leave a fair profit to investors?'

"This question is, I think, satisfactorily answered by Mr. Koch in his report to the Government. His opinion on this point is confirmed by Messrs. Bowman, Craib, and others having experience in working sulphuret ores.

"These gentlemen are quite agreed as to the manner of treatment to be pursued in the reduction of our ores, and when we consider the time, labour, and capital expended in the attempt made in 1878 to work our ledges, it seems almost incredible that those men who were placed in positions of trust as experienced quartz miners, did not introduce either concentrator or chlorinator a '*sine qua non*,' we are now informed, to the successful working of these ores.

"Mr. Koch's report to the Government is generally received as a fair and impartial resumé of the facts relating to the ledges of the district; and much interest is manifested in the publication of Mr. Bowman's report, as the nature of that gentleman's work the past season gave him an opportunity to make a more minute examination of the quartz veins than he has hitherto had. His report will, no doubt, corroborate that of Mr. Koch in all important particulars.

"Mr. Craib, who is at present in the district in charge of the Island Mountain and British Columbia mining properties, was interviewed with the object of getting his opinion on certain questions, and he has kindly sent me an answer, which is appended, and it will be seen that his opinion corroborates the testimony of Mr. Koch in regard to the richness of the ores, and the manner of working them.

"Mr. P. C. Dunlevy, of Soda Creek, proprietor of the Island Mountain mine, was the first, apparently, to grasp the new order of things, and believing that a quartz mine in Cariboo was no longer to be a place in which to sink capital without a probable chance for a return, has commenced the vigorous prosecution of work on his mine, continuing the tunnel into the mountain on the ledge, which improves as depth under the mountain is reached.

"He has a mill site cleared and graded near the north end of Jack of Clubs Lake, and will, I understand, remove during the winter the old Enterprise mill and machinery of which he is now the owner.

"The British Columbia Milling and Mining Company having re-located the old Cariboo location on the Bonanza Lode, have called for tenders for the sinking of fifty feet in the old shaft.

"This company during the summer had 1,000 pounds of their ore taken from the bottom of the shaft (100-foot level) and shipped to San Francisco for a milling test, the result of which I am not aware.

"The Burns Mountain Quartz Mining Company have during a great part of the season had men under charge of Mr. Jaques, of Victoria, at work running drives in search of the main lode, but of the result of their labour I am not informed further than that they have now driven in over eight hundred feet, and consider the indications good.

"The Dominion Company have re-located the old Steadman Lode of Richfield, and are sinking on the ledge which shows a remarkably firm body of ore and a well defined ledge, within good casings.

"The Quesnelle Quartz Mining Company of Hixon Creek have persevered uninterruptedly for the past year in the development of their mine, and word has just come to hand that they have at last succeeded in finding a fine body of ore.

"Some sixty odd quartz locations have been recorded within the last three months upon which more or less work has been done.

"I have, &c.,
(Signed) "JNO. BOWRON,
"*Gold Commissioner.*

"*To the Honourable*
"*The Minister of Mines.*"

REPORT OF MR. ROBERT BUCHANAN AND OTHERS.

"BARKERVILLE, 19th Nov., 1886.

"SIR,—We, the undersigned, beg to submit the result of our expedition to the north-east of Barkerville.

"We started out from Barkerville on the 15th day of July and proceeded to Bear Lake, a distance of twenty-two miles, after which we continued our course in a north-east direction to Big Lake, a distance of about fourteen miles, and followed the shore of the Lake on the north-east side for about eight miles. Leaving the Lake at this point, we followed up a stream to the summit or divide, between Big Lake and the Upper Fraser, having to cut our way through a heavy growth of brush and fallen timber so as to enable us to get our animals and packs along.

"After passing over the summit (which we think is not more than 500 feet higher than Big Lake) at a distance of about four miles we came to a stream, which we called "Goat River," and followed it down about eight miles and struck a stream coming into it from a northerly direction. We crossed this stream and built a cache to leave our provisions in, eleven days from Barkerville.

"Left the cache on the 29th July and followed Goat River down, prospecting on the bars and also on the streams emptying into it and got some fine gold. We were now getting into a slate formation again, similar to that on which the paying creeks are situate in Cariboo proper As we proceeded down the river we got what we considered fair paying prospects of coarse gold on the bars. Still further down we got good prospects in the cañon. Left next day for the Fraser, which we considered to be about twelve miles distant. Prospected on a bar of the Fraser; got a few colours of gold to the pan. Made a raft and crossed the Fraser and went up a creek about a mile, which from it formation looked favourable for gold; but our provisions being about done we were obliged to return. We think that by a direct trail from Barkerville it would be about seventy-five miles to the Fraser, with a level country from Bear Lake to build a trail through.

"From the indications that have been found, if a trail was brushed out so that miners could get through with pack animals to take their provisions and tools in, it is highly probable that next year a new camp would be established which would tend greatly to advance the prosperity of the district.

"We cut brush and blazed trees the whole distance after leaving the old trail beyond Bear Lake, so that no difficulty will be found in following our route; but in some places cut-offs may be made to advantage, thereby shortening the distance when a permanent trail is made.

"We are yours, respectfully,
(Signed) "ROBERT BUCHANAN,
"GEORGE ISAACS,
"ARTHUR JOHNSTON,
"KENNETH MCLEOD,
"N. WILSON.

"*To John Bowron,*
"*Gold Commissioner Cariboo.*"

REPORT OF MR. WM. CRAIB.

"BARKERVILLE, B. C., Nov. 30th, 1886.

"DEAR SIR,—In answer to your questions as to the quartz of this district, viz.:—1st, What is the average assay of the ores assayed by me since I have been here? 2nd, The general character of the ores treated; and, 3rd, What would I suggest as the best method to introduce our quartz interests to capitalists in order that they might be induced to advance the means to prospect and open up the same?

"In answer to your first inquiry: I have been but a short time here and, as you are aware, most of my time has been devoted to preparing for winter work in the mines that I am at present associated with. However, up to date I have made twenty-two (22) assays of ore from the different ledges in this vicinity, and the lowest assay was $27 and the highest $75.23. The average of the total is $46.30; but remember the assays have not been made from specimens, for, with one exception, the pulp for the assay was taken from the crushings of from 4lbs. to 6lbs.

"Your second question—As to the character of the ores treated—I would state that the ore is heavily charged with auriferous pyrites, termed in mining sulpherets, and from tests I have made I find that there is from 30% to 50% of the sulpherets in most of the quartz of the district, and that being the case, the only method that can be applied to extract the gold from them on a large scale will be by chlorination until some more improved system may be discovered.

"Your third and last question would require a Wiggins to answer correctly. My theory of introducing and soliciting capital would be: 1st, Have one or more mills and a chlorination works started up here, and I have no doubt that in sixty days thereafter the result will be so satisfactory that it will serve for an introduction, and the capital will necessarily follow.

"Respectfully yours, (Signed) "WM. CRAIB.

"*To John Bowron, Esq.,*
Gold Commissioner, Cariboo."

Keithley Division.

REPORT OF MR. W. STEPHENSON.

"FORKS QUESNELLE, 8th Nov., 1886.

"SIR,—I have the honour to forward herewith the estimated yield of gold for the Keithley and Williams Lake Divisions, Cariboo District, for 1886.

"The amount is a little less than last year's figures, although apparently the yield should have been about the same, and as far as the mining population is concerned I cannot see much, if any, difference. The season has been an unusually dry one and the water in the streams consequently light, which has been very much against the success of the hydraulic and ground-sluicing claims; but, upon the other hand, the low stage of the water has enabled the miners to get into the beds of the streams and also to do more river work than usual, and at the present time there are a great many miners (Chinese) scattered along the rivers, where they will continue to work until the cold weather compels them to stop. So far, this fall has been extremely favourable for river work, which makes a considerable difference in the amount of gold taken out, and it is the kind of mining the celestials prefer, as they can take all their outfit upon their shoulders and go off independently, although generally working in pairs. In my section of the Fraser River there has been a considerable number of companies formed during the last year for the purpose of bringing the water from the nearest streams for working the benches of the Fraser, in fact, from the Mouth of Quesnelle as far down the Fraser as I go, every stream of water that is possible to get is recorded and conveyed in ditch or flume to some of the benches along the river and there used for mining purposes.

"This has not been a favourable season for those claims situated on the benches of the Fraser as, owing to the dryness of the season, their supply of water gave out early in the season, in many cases stopping work by the 1st July.

"In the Horsefly section the parties prospecting there last winter did not succeed very well in finding paying claims, and about all the gold from Horsefly came out of the old Horn King claim (Chinese), although there has been five or six men prospecting all summer and there is a company of three white men in there for the winter; also, Mr. Harper has men at

present fitting up winter quarters for men and teams, and I hear it is his intention to have all necessary machinery on the ground next spring and it is to be hoped another season may give a better report from the Horsefly section. Sam. Kyse and E. Hilton have again been out during the summer in the vicinity of South Fork Lake. They do not report that they have found paying diggings, but they have found gold and think that they may yet find it in quantities to pay; they propose going back again next season.

"From Keithley and Harvey Creeks there is nothing new to report, but I think as a general thing they have done quite as well as for the previous season, while Snowshoe Creek looks decidedly more encouraging than for several years past, as the Great Snowshoe Company (better known as the long tunnel) after five years' hard work have got into the bottom of the creek and found gold in paying quantities. The claim has now been paying for the last four months, with every prospect of being a good claim.

"Concerning quartz there is little to be said, as there is very little interest taken in the matter in this section. There has only been one location made on this side of the mountains, that by Veith & Borland, upon Snowshoe Mountain on the old Hayward ledge. They have cleaned out the old tunnel, taken some rock out of the face of the drive and shipped the rock down country to have it worked as a test of the ledge.

"I have, &c.,

(Signed) "W. STEPHENSON,

"*Government Agent.*

"*The Honourable*

"*The Minister of Mines.*"

CASSIAR.

Stickeen Division.

MR. CRIMP'S REPORT

"LAKETON, CASSIAR,

"12th October, 1886.

"SIR,—I have the honour herewith to transmit the mining statistics of the Cassiar District for the current year, and for your further information to submit the following report:—

"The accompanying statistics will be found to shew an increase in the product of the mines the present year over last year. There have been fewer white miners in the district this year than last, but more Chinese; and it is chiefly owing to them that the increase in the yield of gold has taken place, and if it had not been for the continued rains during the month of September, the increase would have been considerably larger. During that month the several creeks were very high, and in consequence carried away many of their wing-dams, thereby causing a severe loss to them. Although these creeks have been worked over—some portions of them two or three times—the Chinese, by their excellent management and industry, are enabled to take out small wages. On Dease Creek, the increase was the largest. More Chinese were on that creek than any of the others, and most of them worked in the bed of the stream. All of the white men on the same creek have been working in the hills, and some of them have done very well; and the same may be said of the other creeks, for the beds of those streams having been worked over so many times, there is no inducement for the white miners to open claims in the old worked out creeks.

"The yield for this past season, as far as I can ascertain, is as follows:—

Laketon Division	$41,460
McDame Division	22,150
Total	$63,610

"There has been but little prospecting done in this district the past summer. There has been four white men prospecting on Mosquito Creek the past year, and although they have found very encouraging prospects, they have not found gold in sufficient quantities to pay; but are still in great hopes of striking good pay when they reach more favourable bed-rock, for the rock is so hard and smooth where they are working that it is impossible for gold to lodge.

"There were also three white men, Messrs. Hilton, Sainsbury, and Beedy, prospecting on the Muddy River, a large stream to the east from the present mining district, situated about ninety miles east of Sylvester's Landing. The stream is a large one, running through a very wide valley, and emptying into the Laird River, about eighty miles below Mr. Sylvester's trading post. Mr. Hilton informs me that if it had not been for the high state of the river, he thought they would have done very well. In consequence of the high water most of the bars were covered; but wherever they found bars, at the head of them they prospected very well. On one occasion, two of them rocked out $100 in one day; and on another, one man rocked out $140 in seven days. The character of the gold is fine, and has to be saved with quicksilver. In 1874, there were eight men on the same river, some distance above, where the mountains come much closer together, and I have been informed by one of the parties a few days ago, that they found coarse gold, which he thought would pay five dollars per day; but at that time wages were eight dollars per day on Dease Creek, so they concluded that it would not justify them to remain there. He tells me, also, that he thinks the distance from Dease Lake to where they got these prospects is from 90 to 100 miles, in an easterly direction from Dease Lake. Taking into consideration the excellent prospects found on the bars, of fine gold, it leads to the conclusion that its source is in the mountains. I would strongly recommend that the Government make a small appropriation to assist, say three or four men to get an outfi next summer to proceed there and prospect this stream, or creeks emptying into it, for unless some new discoveries are made, this district will be soon reduced to a very small number of miners.

"The number of men wintering in the mining portion of the district is 29 white men and about 70 Chinamen. The health of the miners during the past season has been generally good, and good order has prevailed all over the district.

"The supplies on hand in the stores of the traders are, I think, sufficient for the wants of those that winter here. With the exception of rice, of which there is but a small supply on hand, and unless the pack trains make another trip, which I think they will, for there is a good supply at Telegraph Creek, the market will soon be exhausted of that article. The prices of provisions are as follows:—Flour, $14 per 100 lbs.; rice, 17 cents per lb.; sugar, 30 cents per lb.; hams, 37½ cents per lb.; bacon, 35 cents per lb.; potatoes, 9 cents per lb.; corn beef, $10 per case; roast mutton and beef, $10 per dozen; wild meat—moose and cariboo—20 cents per lb.; and the market pretty well supplied.

"I have, &c.,

(Signed) "J. L. CRIMP,
"*Gold Commissioner.*

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

Skeena Division.

MR. GRAHAM'S REPORT.

"LORNE CREEK, B. C., 6th November, 1886.

"SIR,—I have the honour to enclose statement of proceeds of this season's mining. I regret to have to report so small a yield. The season has been very unfavourable for working Lorne Creek; high water continued till late in July. The channel of the creek is so narrow, that flumes have to be constructed to carry the whole creek, which require from four to six weeks to build, having all lumber dressed on the ground. Half the season was passed before any gold was 'cleaned up.' Had the season been similar to 1885, twice the amount of gold would have been taken out. The hill claims could not work to advantage, owing to creek claims not being worked out. The prospects are favourable for next season in hill claims. Considerable work was done on Douglas Creek, Kitsumqualum, but gold in paying quantities was not found.

"There are two streams on the Upper Skeena, on which Indians report having seen gold. I had hopes last spring of having them prospected during the summer, but our mining season being so short, all the companies were anxious to work all the ground they had flumed, and means being short, could not be induced to take a prospecting trip. On one stream near 'Kiskagas,' from all I can learn of the formation—slate, with quartz—I believe there is gold in paying quantities Eleven miners intend wintering here. Hoping to have a more favourable report before spring,

I have, &c.

(Signed) "ALLAN GRAHAM.

"*To the Hon. the Minister of Mines,*
"*Victoria.*"

KOOTENAY.

Northern Division.

MR. SPROAT'S REPORT.

"FARWELL, KOOTENAY, 20th Dec., 1886.

"SIR,—There is little doubt that the Big Bend subdivision of this district will prove to be valuable, both for placer and quartz mining, gold probably being the principal product.

"The region was not opened, practically, until so late a time as last August, owing to the unusually high water and the want of a through trail, so that it is hardly correct to speak of a 'season's' mining in the usual sense of the term. The trail since that date has been opened; it is cut for over sixty miles through the forest. The want of horse feed for the first thirty miles has made packing very dear—10 cents a pound through—about as much as the rate from Ashcroft to Cariboo.

"Notwithstanding these disadvantages I think I am justified in saying that the outlook is good. This opinion is shared by many visitors to the district who are well able to judge. The miners themselves are well pleased with their prospects. I did not meet a despondent miner during my Gold Commissioner's visit, which occupied from 12th August to 13th September.

"The general opinion of the miners is that Downie Creek is the proper place for a record office, being accessible from McCulloch and French Creeks as well as from Carnes Creek, and they expressed a wish that the Gold Commissioner next season would be more among them. I was able to settle disputes during my trip without holding a formal court. I found many claims irregularly held and thought it well to issue a cautionary notice to prevent disputes next season.

"In the Big Bend subdivision there are recorded 58 placer and 77 mineral claims.

"*Quartz Mining—Big Bend Subdivision.*

"Beyond work necessary to hold the claims the quartz mining in the Big Bend region is at a standstill. This industry cannot be developed without some means of introducing machinery. A small prospecting stamp mill is lying here unused as it cannot be packed through on the trail.

"The region is practically unprospected, but the mineral claims recorded lie, for the most part, around the headwaters of McCulloch and French Creeks. The numerous gulches and ravines generally run in an easterly and westerly direction and have cut the ore in the belt often at right angles. In other places there are outcrops on the hillsides. Specimens from both these occurring ores have proved to be rich; some show gold to the eye. Most of the ore seems to be auriferous milling ore, but whether it will preserve that character when sunk into or turn to less tractable ores, or, as some conjecture, to silver-bearing ore of some kind, possibly argentiferous galena, cannot be stated at present. Nor is it known, of course, yet, how many, or whether any, of these recorded mineral claims are veins of a kind and quality that would pay for working. The general opinion of men experienced in quartz mining elsewhere is that some of these Big Bend prospects are likely to prove good, but I have no information before me that would enable me to test that opinion. It is quite possible that the province has great wealth there, and I hope that the capital, organization and intelligence necessary in the business of quartz mining will soon be brought to bear on that portion of the district. Very remarkable results are obtained in this business from the improved methods of modern days. For instance, it is found that in the colony of Victoria, Australia, crushing auriferous quartz pays if it contains as much as 5 dwts. of free gold per ton—that is of gold not associated with pyrites. When it is associated with the less tractable forms of pyrites 1½ oz. to 3 oz. are required; but speaking broadly Victoria has made its fortune out of gold deposits which yield on an average less than *half an ounce* a ton.

"There are many apparently mineral veins at Big Bend; small parcels have assayed from $50 to $150 a ton; the mining region is near a great navigable river crossed by the Canadian Pacific Railway; the climate is not severe; there are arable and hay lands and three months summer hill pasture, also abundance of wood. With a steamer on the Columbia the mines would be within two days' reach of the above railway. Under these circumstances, every effort should be made to ascertain the true character of the ores and the size of the mineral veins in a district in which all mining conditions are so good. No quartz area in the province is so well situated.

"*Placer Mining—Big Bend Subdivision.*

"Notwithstanding the short, broken season and expense of packing, placer mining has made great progress, though, of course, the product cannot be large yet.

"There is one bedrock flume, but the placer mining is chiefly carried on by tunnels and shafts, though some miners are making good or fair wages by sluicing and shovelling into boxes. As a rule, the diggings on the creeks now being worked are deep diggings, requiring companies with capital, but a great area is quite unprospected, and more 'poor men's diggings' may exist than we know of. The creeks now being worked were pretty well turned over when occupied twenty years ago, at least the lower portions of them were so.

"The localities of work at present in the Big Bend subdivision are at Carnes, McCulloch and French Creeks. There is plenty of untried ground, partly for shallow but chiefly for deep placer diggings, on Carnes and French Creeks with their affluents, and numerous creeks in the region are unprospected and believed to be very likely mining creeks. Smiths Creek, a large broad-mouthed tributary flowing from the west into the Columbia, about opposite the mouth of Gold Creek, was struck towards the close of the season, and three companies are sluicing there and getting fair wages.

"The three creeks above named, all of which yielded well twenty years ago, promise well now, but so far the work during the late short, broken season has been preparatory rather than actual. It is almost certain they will yield largely next season and that good new creeks will be found.

"*Carnes Creek.*

"This creek from mouth to forks is six to seven miles long, and the forks are supposed to be each about the same length.

"The miners much want a trail up to the forks; they have cut a trail two miles up.

"It is a good-sized creek, larger than Antler Creek at Cariboo, probably about the size of Thibert Creek, Cassiar. The cañon is a quarter of a mile from mouth; wide gravel banks below cañon; above cañon, narrow, 50 ft. to 150 ft., generally sloping V-shaped sides, but a few benches, all densely wooded. Good drifting timber handy; bottom, gravel with comparatively small boulders interspersed.

"Climate good, much the same as Farwell, 29 miles off. This year the miners are working open diggings up to this date; could begin to prepare for work probably end of March.

"Carnes Creek being more accessible, cheaply, by boat or trail than McCulloch or French Creeks, has yielded most during the short, broken season. One company since striking shallow bedrock has made $8 to $10 a day per man on an average, and occasionally three times that pay. Two companies without reaching bedrock have made good wages by shovelling gravel. One company have done very well on a hill claim immediately above the cañon. A party is fluming the cañon. Two companies about a mile and a half above the cañon are sinking for bedrock, but having struck water at about 40 feet are preparing hoisting gear. A short distance below a miner is putting in a dam and is going to flume. On the south fork a company have sunk a shaft of 53 feet. A strong company have taken a set of claims at the mouth of the creek and propose to turn the creek and work the present bed, and also have leased bar diggings in the Columbia River near the mouth of Carnes Creek.

"Between the mouth of Carnes Creek and the forks I estimate roughly that there are about four miles of unoccupied ground and the forks are open, except the set of claims on the south fork above mentioned. The general character of the Carnes Creek diggings is deep—on a conjecture, say from 40 ft. to 75 ft. to bedrock. All the miners are hopeful and interests have been sold at good prices. There will be much work on this creek next season.

"*French Creek.*

"This creek, the well known creek of twenty years ago, has been re-attacked and promises as well as Carnes Creek. It is a northern affluent of Gold Creek, coming in about eleven miles from the mouth of the latter. Gold during the season has been found in paying quantities both on hill and creek. Its distance and the late opening of the trail have checked development this year, but the two companies at work have done well and are hopeful; one of them proposes to work all winter. Two additional companies have been formed, but too late to do any effective work. The Creek Company is working on old ground near the mouth

from a shaft with hoisting gear for dirt. They use a bedrock drain from old workings. Having struck bedrock they got gold in good paying quantities last August, but shut down to put in machinery. They have lately completed this and resumed work, but I have not been able to hear with what results. The hill company, lower down, are working from a tunnel and have been making an average of $7 to $9 per day per man, though working with only a little water that came out of the tunnel. Next spring they propose to bring a ditch level with the tunnel. These are two very good claims. A company has been formed to work a set of claims recorded immediately above the first named, and another company is making preparations for work higher up. These are the only companies on French Creek, and the result of their work is most encouraging, considering the shortness of the season, the high prices and difficulties of access. French Creek, with its affluents, offers about 25 miles of ground. I need not describe a creek so well known to old miners.

"*McCulloch Creek.*

"This Creek is nearly all occupied by the Gray's Bedrock Flume Co., which has one and a half miles at the mouth, and the Bald Head, Blue Bell, Ericson and Selkirk Companies above. It is a short creek about five miles long, flowing from a grassy amphitheatre among the hills called Ground Hog Basin, southerly into Gold Creek, which it enters about three miles west of French Creek. Its channel towards the mouth is a boulder-strewn gorge, with a considerable descent. The bedrock, except in the upper part, is believed to be deep; it has not been reached, in one place, at 85 feet. These companies are running tunnels, one is in now about 1,000 feet, but bedrock has not been got yet; they are going to work during the winter. Gray's, or the Ophir Bedrock Flume Company, have just put in a considerable length of flume, but by last accounts had not reached bedrock. The boulders make their work very heavy. I have been expecting to hear the result of their washup. It is said Mr. Gray proposes to run a tunnel during the winter.

"More work has been done in the past season on McCulloch Creek than on any of the other creeks, and the persistent energy of the miners here, as elsewhere, is worthy of commendation and imitation. They are confident that the bedrock when struck will prove rich. The work continues during the winter. If necessary I will make a supplementary report respecting work on McCulloch and French Creeks should information reach me during the winter.

"*Ille-cille-waet Subdivision.*

"The country around Farwell, and I think most of it between Carnes Creek and Farwell, is, probably, not a mineral section. The mineral belt runs south-easterly behind Farwell, crossing the Ille-cille-waet valley some distance up it, between Farwell and the summit of the Selkirks, which latter, for anything I know, it may include. Sixty mineral claims have been recorded in this section and settlement work done on many of them. No placer mines have been recorded; I do not think the section has been prospected much, if at all, for placers. The ores seem to be rather silver than gold-bearing and, for the most part, smelting ores. The belt generally has not been examined closely, but is said to consist generally of slates or schists. Some rock brought here lately from the Ille-cille-waet, however, is described as either black limestone or lime shale. This rock is that in which most of the big carbonate and galena silver mines in the United States are found, with few exceptions. The Ille-cille-waet section, consequently, has attracted much notice lately from men possessing or backed by capital. Considerable quantities of ore have been sent to England and different parts of the United States, but there has not been time for me to learn the returns. The veins are both low down and high up, but those promising most, so far, are high up, and could not be well examined this season for the snow. This will be undertaken in the early part of next season, when it is expected the result will be satisfactory. To utilize these mines a local smelter is essential.

"The following is a copy of an assay of ores from a group of these veins made here last month by an American capitalist, who proposes to return in the spring:—

No. 1.....	$126.25	Silver per ton.		No. 6.....	$ 60.08	Silver per ton.	
" 2.....	175.83	"	"	" 7.....	59.00	"	"
" 3.....	34.05	"	"	" 8.....	609.00	"	"
" 4.....	50.00	"	"	" 9.....	41.68	"	"
" 5.....	84.08	"	"	" 10.....	384.77	"	"

"*The Southern Subdivision.*

"This includes the Arrow Lakes, Lardo River and down to the boundary, but not Big Kootenay Lake. Eight mineral and two placer claims are recorded in this section. Prospectors turned their attention more to the Big Bend and Ille-cille-waet divisions and the extensive southern section consequently was somewhat neglected. The few miners who visited the Lardo for placer mines returned disappointed. There are indications of silver-bearing galena on the Arrow Lakes, but the country is unprospected. Those who recorded mineral claims on the Pend d'Oreilles near the United States boundary spoke well of them as 'prospects,' but there being no steamboat on the Columbia I shall probably not know this winter how they are getting on. The block of country about Fort Shepherd, chiefly on the east side of the Columbia, bounded by that river, the Kootenay and the U. S. boundary, a country in which the well-known Forty-nine Creek and Salmon Creek head, will I think prove to be a mineral section, but at present, without a steamboat on the Columbia, that corner is an appendage of Colville.

"I enclose the tabular form of mining statistics. In a district so lately opened these hardly give a satisfactory notion of the work being done. Other duties prevented my visiting much of the district in the short time since the trail to Big Bend was opened.

"About 223 men were employed in the mines, and I estimate that about 150 additionally traversed the district prospecting

"No Chinese are employed in this district in mining or in any other occupation.

"A party left here late in the season to winter on Canoe River as hunters and prospectors.

"The trail made by the Government from Farwell to Gold Creek is of the greatest value, indeed essential to any mining work in the Big Bend subdivision. The promptitude of the Government in making it is highly appreciated in the district.

"The survey party under A. P. Cummins, C. E., charged with the duty of making an exploratory survey for a waggon road from Downie Creek to Gold Creek has not yet returned.

"The result of their survey will be embodied in my report to the Hon. the Chief Commissioner of Lands and Works.

"I have, etc.,

"*The Honorable* (Signed) "G. M. SPROAT, G. C.

"*The Minister of Mines, Victoria.*"

Southern Division.

MR. VOWELL'S REPORT.

"KOOTENAY, B. C., 31st December, 1886.

"SIR,—I have the honour herewith to forward for the information of the Government my annual report, which includes mining statistics, etc., for the year ending 31st December, 1886.

"Owing to the great drought that prevailed during the past season the hydraulic claims on Wild Horse Creek could not be worked to advantage, and in other localities the scarcity of water materially affected the general output of gold.

"The total yield for 1886 amounts to about $50,000, a sum which might have been doubled had the season been more favourable. Next year, however, it is hoped that a better account will be given of our placer and hydraulic mines, as arrangements have been made by many claim-holders for the placing of improved machinery, etc., upon their mining ground early next spring, when every advantage can be taken of the superabundance of water available at that time of the year.

"Desultory mining on outside and upon small creeks has been much the same as last year, except as regards the supply of water which, as stated, has not been at all equal to the requirements of the miners.

"So far as I am aware no discoveries of placer mines have been made during the present year in the district, though as affects quartz containing respectively silver, gold, and other minerals, many new locations have been made from which fair assays have been obtained. As, however, no capital has as yet been invested in such enterprises it is impossible to arrive at anything bordering upon a correct estimate of the value of such mining properties.

"There is every probability that during the coming year the attention of capitalists will be directed towards the development of some of the rich mineral deposits known to exist in the district when the advancement and prosperity of this portion of the Province will, it is hoped, be established.

"On Perry Creek, west of Wild Horse Creek, considerable mining has been done in early days, and much gold taken from the lower portion, below the falls, of that creek. Several attempts have been made to work the deep ground, but owing to the difficulties to be encountered, and the want of capital, these efforts ended in abandonment.

"There is no doubt in the minds of those who, from their experience, are capable of forming an opinion as to the richness of Perry Creek, especially in the upper and deep ground, and that could some company with sufficient capital be induced to take an interest in its development a prosperous mining camp would be the result. On Findlay Creek Cochrane & Bradly have had a number of men employed in making roads, building houses, and in the construction of an extensive ditch in connection with their hydraulic works.

"Hydraulic pipes, giant, etc., and a saw-mill have been placed on the ground, and it is expected that the works will be in full operation next summer.

"At Kootenay Lake nothing more than the work necessary for legal representation has been done upon the mineral claims in that vicinity, and although the prospects are as good as ever very little interest is manifested by those immediately concerned. * * *

"I have, &c.,

(Signed) "A. W. VOWELL,

"*The Hon. the Minister of Mines.*" "*G. C. & S. M., &c.*

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE, CLINTON,
"December 8th, 1886.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual mining report for the District of Lillooet for 1886.

"The total yield of gold for the district is largely in excess of former years that I have had the honour to report on, and may be itemized thus:—

A. W. Smith	$ 57,900
F. W. Foster	16,517
E. Bell	13,700
All other sources	43,883
	$132,000

"Referring to the large amount bought by Mr. Smith, I cannot do better than quote his letter to me, containing, as it does, valuable information and matter of import bearing upon the comparative industry of the Chinese and Indians as against that of the white miners.

"He writes * * * 'The amount of gold which I have taken in during the 'year from 18th October, 1885, to the present (16th October, 1886,) is 3,620 ounces; value, '$57,900. The localities from which the above has been taken are as follows:—

'Bridge River	1,440 ounces
'Cayoosh Creek	725 "
'Fraser River	1,455 "

'The gold from Cayoosh Creek is the most valuable, and I believe that there is as much 'of it in the hands of the Chinese miners as I have bought. The mining on Cayoosh Creek 'has all been Chinese work except, say, $100 by Indians and whites. I do not think I have 'seen over $300 in dust that has been taken out by white men during 1886. The other traders 'here have sent away some gold, no doubt, although not more than $10,000 Also private 'parties have taken more or less, two Cayoosh Creek miners (Chinese) left a few days ago with '$3,000.'

"Mr. Phair, Mining Recorder, has made several visits to Cayoosh Creek this season on official duty, and reports to me that 'The diggings on Cayoosh Creek were discovered in the 'spring of this year by Chinese, and they recorded *190* claims on it, and white miners *16*. Some

'of the claims have paid well, but some recorded during high water have been abandoned. The 'gold is very coarse, and sells for $16.50.'

"It seems almost incredible that this creek within an hour's walk of the town of Lillooet should have been passed by for a quarter of a century by hundreds, aye thousands, of the best practical white miners and prospectors on the Pacific Coast, and now at this late date the prize falls into the hands of the Chinese. Mr. Smith has purchased dust from it this year about $12,000, and estimates an equal amount in the miners' hands, in all say $24,000 for this season alone, and, of course, the creek is not worked out, and is one instance, at least, that may be placed on record that prospectors and miners in the past have not been by any means thorough in their search. Bridge River has done well this season, but must express my regret that white miners did not return there to the number I expected when reporting to you last year. Mr. Phair has also made several official visits to this section this year, and reports to me that—'On Cadwallder Creek, Bridge River, 10 whites and about 40 Chinese were 'mining. Three white men sank three shafts 14, 42 and 47 feet respectively, and found gold 'in every pan. Hydraulic claims will be opened in the spring on this creek. There is abun-'dance of room for this sort of mining on it, as there is one flat alone of about 25 acres. There 'are well-defined quartz ledges on the South Fork and tributaries of Cadwallder Creek.'

"*Quartz.*

"Commencing with the N. E. portion of the district, one or two parties have been prospecting in that section, and mineral claims have been located on a ledge near Mahood Lake. A ledge has also been discovered on Deception Creek, and two claims located on it. In both cases the parties owning the claims inform me that they have had assay returns from surface croppings showing the presence of gold and silver. I regret to say that the locators have decided not to do preliminary work on these ledges until next spring, which means in that portion of the district next May—a loss of six months at least. It is to be sincerely desired that this system of Hibernation, the result, in a great measure, of the customs of our early alluvial mining history, by which labour of every kind is annually paralyzed for from four to seven months, will cease. As a people we never can have material prosperity while it prevails to such an extent in all industries, and so far as quartz mining is concerned there can be no valid reason for continuing it. The mica ledges on Clearwater have, I am informed, been visited by an expert in that mineral in the past summer; he advises sinking on the ledge to ascertain whether the mineral improves in quality and is free from fracture. Quartz prospecting west of the Fraser River has been vigorously pursued in the past summer by Messrs. Gould and Ward. They have handed in a report of their season's work, a copy of which I enclose herewith. These men have prospected faithfully, and worked hard, and are most deserving of success. They have discovered and located claims on a sulphuret ledge situate about two miles below the Big Slide, on the west side of Fraser River, and at the present writing are still engaged prospecting on it. The ore is exactly similar to that of the Big Slide; assays have been made from surface croppings, $20.62 gold and $2 silver being the highest. Specimens of a Jasper quartz containing free gold, and assaying $300 to the ton, were found in the early part of the year in three different places within the surveyed bounds of the town of Clinton. A portion of these were forwarded to Mr. Elwyn, Deputy Provincial Secretary, who sent them on to Dr. Dawson, of the Geological Survey, at Ottawa, who in reply remarked that the specimen 'is quite interesting, and as there is comparatively little northern or general 'drift met with in the vicinity of Clinton, I think it would be quite worth while to make 'careful search in the vicinity for the deposit from which the auriferous specimens must have 'come.'

"The drift to which Dr. Dawson alludes will, I am afraid, be the great barrier to the discovery of the ledge. The glacial deposit covering the ledge may be five or five hundred feet deep, and the former would be just as effectual as the latter in concealing it, as there is not the slightest guide to its locality. The opinion prevails that this valley (about 20 miles in length) has at some period in the world's history been the bed of a river, and that by sinking rich auriferous deposits would be found. I have no doubt this will yet be done, but am afraid it would be too much of an undertaking for any ordinary company of prospectors. From the nature of the surroundings, I imagine, water would be the great obstacle to reaching bedrock without the aid of powerful machinery. The great incentive to quartz prospecting in this district during the past season is the opening of the Big Slide mine—referred to in my reports of the past five years—by a duly incorporated company, and known as the Foster

Gold Mining and Milling Co. For years past we have been told that nothing can be done with our quartz ledges unless foreign capitalists can be induced to take hold of them. I have no doubt foreign capital and capitalists will have a very great deal to say in the opening of our quartz ledges all over the Province in the near future. But so far as the Pioneer Ledge (I must claim this title for it) is concerned, the Big Slide mine is, I am glad to say, owned entirely by British Columbians; every cent of expenditure is British Columbia capital, and it is most sincerely to be hoped that the parties who have invested in this enterprise will reap a rich reward.

"The Incorporated Company own three claims, each 1,500 feet along the line of ledge, commencing at the junction of Kelly's Creek with Fraser River and running thence S. E. 4,500 feet. In the past season the ledge has been traced to the Grotto Gulch on Pavilion Mountain, a distance in all of nearly 2½ miles. Six new claims have been located on it, preliminary prospective work will be commenced on them at the close of the present laying over season. Before reporting to you on the work done on the Big Slide mine now opened I deemed it advisable to make a personal inspection of the premises, and to that end paid a visit there ten days ago.

"In opening out this mine the natural difficulties in the way were enormous, and at the very outset would have proved an effectual barrier to a less determined and energetic man than Mr. Henderson, the company's superintendent, who evidently does not know the meaning of the word 'fail.'

"No amount of written explanation would ever convey even a faint idea of the nature of these difficulties, nor the vast amount of work that has been done to surmount them.

"The road into the Big Slide mine diverts from the Clinton-Lillooet waggon road at a point near the 35 Mile Post, twelve miles from Clinton, and follows the line of the Kelly Creek Cañon, a distance of five miles. The construction of this road has cost the company $5,000. The grades on the first three miles are fairly moderate, the fall being about 400 feet. At this point the company's sawmill is located, in a tract of excellent fir timber Logging, sawing cordwood, and charcoal are all under contract and in active preparation. Mr. Eagan, the contractor, kindly gave me every information and all particulars concerning his camp. The engine of 16 H. P. and sawmill of a capacity for cutting 5,000 feet per day are both well housed, and unless in extreme cold snaps will run all winter. Mr. Eagan informs me that his contract is for 400,000 feet of lumber, of which he had then cut about 160,000 feet, 5,000 bushels of charcoal, and 1,000 cords of wood. He has a force of 15 men at work and eight powerful horses. From the sawmill camp to the end of the waggon road (two miles) the grades are enormous, the fall being nearly 1,700 feet. From the end of the waggon road to the mill site at high water mark on Fraser River, is a distance of 1,000 yards, with a fall of 700 feet, (the altitude measurements are mine, by aneroid barometer, and may be taken as approximately correct). A roadway from this point, from the nature of the surrounderings, was out of the question. This obstacle has, however, been overcome by the construction of a tramway the entire distance of 3,000 feet to the mill, down which everything is lowered. The tramway is constructed of two rails of sawn fir timber 8" by 10" laid on substantial trestlework, over which a load of 5,000 lbs. at a time can be safely and quickly lowered. At the date of my visit the whole of the mill machinery and chlorinating appliances were on the ground, at the end of the waggon road, and the various uses and the method to be adopted for the extraction of the precious metals from the ore were clearly explained to me by Mr. Henderson. Since then I understand timbers and lumber for the mill, and brick for the furnaces, have been lowered over the tramway at the rate of from 6 to 7 tons daily.

"The ledge has been tapped by three tunnels at different levels. The lowest or long tunnel is 240 feet in length from the mouth to the point at which it cross-cuts the ledge. From this tunnel all ore from the mine will be conveyed to the mill. Active work, day and night, is in progress on all three levels drifting east along the line of ledge, by taking out the country rock and leaving the ledge standing until the mill is ready. Upraises from one tunnel to the other have also been driven, thus insuring an abundant supply of pure air in the mine.

"Mr. Henderson has handed in a report on the mine to me, with list of test assays made by him from different places on the ledge, copies of which I enclose herewith.

"Quoting from my report to the Hon. the Minister of Mines in 1881 is this reference to the auriferous value of the ore in the Big Slide ledge: 'Testing the ore on the ground was 'tried by roasting and then grinding in an arastra of the most primitive nature, with a result 'of $12.50 to the ton of 2,000 pounds.'

"With every confidence in the scientific assays that have been made from the Big Slide ore in San Francisco, New York, London and other places, and also those of Mr. Henderson, I have always placed my faith in the value of the Big Slide ledge on the very crude test made in 1881 by the Cornish miner, John Chenhall, and his arastra and quicksilver process.

"Since then science has demonstrated the fact that the infinitesimally fine gold locked up in sulphuret ore can be nearly all extracted and saved without the unsatisfactory and expensive aid of arastra wheels and quicksilver.

"The ledge running through the company's three claims is practically inexhaustible, showing on the surface hundreds of feet above the level of the tunnels, and may extend to unknown depths below that level. Mr. Henderson informs me that it is his intention, as soon as the mine is fairly opened, to sink down on the ledge below the level of the lowest tunnel, to determine the width and value of the ledge as it deepens.

"Up to the present I understand the company have expended nearly $30,000, which includes the mill on the ground.

"I have, &c.,

"*To the Hon. Jno. Robson,* (Signed) "F. SOUES,
"*Minister of Mines, Victoria.* "*Gold Commissioner.*"

MESSRS. WARD AND GOULD'S REPORT.

"BIG BAR, 5th November, 1886.

"SIR,—We beg to report the result of our various prospecting trips in Lillooet District this year. Starting from Clinton on the 16th June last, went to the Big Slide and prospected from that point up Fraser River, 8 miles. Near to Wood's Ranch, in the mountains, found a ledge of quartz, about 5 feet wide, carrying sulphurets—a well defined ledge—and as we thought, very good rock. Returned to Clinton and sent some samples to Victoria for assay. Got powder and tools and returned to the ledge, and spent 5 days' work cutting into the ledge, but getting no favourable returns, we suspended operations. Crossed Fraser River to the west side and went up Watson Creek about 7 miles; here, on the south side of the creek, we found some very heavy, lead coloured, rock, which we thought contained lead and silver. Sent some of it to Victoria for assay—got returns—no gold or silver, but a very large percentage of arsenic, and were requested to get two large cube specimens of it for the Provincial Museum and the Geological Department at Ottawa. We now returned to get our outfit at Clinton for Bridge River, and left 6th August. Crossed Fraser at Big Bar, went in the mountains until we came on to Ward's Creek; followed this stream up until we came to French Bar Creek, about 8 miles from its mouth. We prospected here, and found a small prospect of heavy shot gold in a bank of gravel, about 15 feet above the level of French Bar Creek. We followed this stream up about 6 miles in a S. W. direction, crossed over the mountain, and camped on a small creek emptying into Lone Cabin Creek. Next day we came to a small creek running through a cement formation; prospected here for gold, but could not get a colour. We went from here in a westerly direction, and camped on a branch of St. Mary's Creek. We tried a few pans of gravel taken from the lower flats on this creek, and got small prospects of heavy, fine gold, but not in sufficient quantity to pay for working. We followed down this creek until we came to St. Mary's Creek, crossed it and went up in the mountains, and camped at Ground Hog Corral. The waters from this mountain flow to the west into Bridge River, and to the east into Fraser River, this being the dividing ridge. There is a very large quartz ledge about 3 miles east from here, which we will spend some time on, when we return We went from here down a small tributary of Bridge River, prospected, and got a few colours of gold. Found float rock in this creek, which is a mass of sulphurets, and brought back specimens of it. Went from here to a large creek, which we take to be the head waters of the North Fork of Bridge River. This is a very rough-looking creek, full of large boulders. In it we could get a small prospect of heavy scale gold, but did not find anything that would pay. We also found two quartz ledges on this creek, samples of which we brought in. We followed an old Indian trail from here and crossed a low divide, and came on to a large creek, which we called the West Branch of the North Fork of Bridge River. We stayed here a number of days prospecting for quartz; could get some pretty fair prospects in the bed of the creek, and from a bench 60 feet above the level of the creek, got a prospect of heavy shot gold, which we think would pay to hydraulic. We believe there are a number of

claims in the bed and on the benches of this creek, that would pay fair wages. We came across no quartz ledges in our explorations on this creek. We then crossed the creek and proceeded in a westerly direction up in the mountains, intending to make our way to the head waters of the South Fork of Bridge River. We found an old trail, very difficult to get our horses over; but made our way to the summit among the snow banks of last winter, and camped. Got some quartz here, and started ahead next day, but had to return to our last camp, as it commenced to snow very heavily. We lay over here for one day for more favourable weather, but on rising the following morning the ground was covered with a fresh fall of snow 8 inches deep, and concluded that it was better not to cross the mountains, as it was now too late in the season (Sept. 7th), so we turned our backs on this snow camp and returned to the West Fork of Bridge River, up which we travelled for 18 or 20 miles in a north-west course to a high peak, which we called Castle Mountain. We camped a short distance from this peak and spent several days in the locality, but could find no quartz to amount to anything. We think the water from here runs into Gun Creek, a tributary of Bridge River. We went 5 miles north from here, and on a small creek picked up some small stones of a dark colour, perfectly round, ranging in size from a buckshot to that of a hen's egg, specimens of which we sent in to you. We followed up the side of the mountain to trace them. On the summit we came to a large body of cement, and as ages had crumbled away this formation, the stone bullets dropped and rolled down to the creek. We now started back for Ground Hog Corral, about 2 miles east of Castle Mountain. We picked up a number of petrified shells near the top of the mountain, shewing that this part of the country has at some time, in past ages, been under water; and we estimate the elevation above sea level now at between 6,000 and 10,000 feet. As our horses were packed for the move, we did not succeed in getting as good specimens of this kind as we wished. We think this part of the district would be very interesting for a Geologist to spend a couple of months in, and we hope before long it will be visited by one. We arrived back at Ground Hog Corral all right, and spent 10 days here prospecting an enormous ledge of green and purple looking quartz, which is from 80 to 100 feet wide, and we have traced it for a distance of 16 miles; its course is north-west and south-east. We spent considerable time on this ledge, as we thought if we could but get a small assay from it, it would prove to be the Comstock of B. C. We sent some of this in to you for assay, but so far we were doomed to disappointment, as the returns you sent us from Victoria were *nil*. However, we brought in a lot of samples from different parts of this gigantic ledge, which we intend having tested. We went from here about 15 miles south-west, and found a large and well-defined ledge of green and yellow quartz, about 40 feet wide. We brought some samples back with us, but had no time to thoroughly examine the ledge, as we encountered one of the heaviest snow storms we had passed through since leaving Fraser River. We left our camp right among the snow peaks, and in crossing the summit got into the terrible gale of 24th September. It was hard work to get our horses along, as the wind almost took them off their feet, and the drifting snow blinded both them and us However, we got into the valley all right and pitched our tents in 6 inches of snow, but stayed here only one night, and then made our way back to Ground Hog Mountain.

"The view from here is magnificent: to the east you can see the Limestone Range, near Clinton; to the south the Saw-tooth Range, across the Main Bridge River; and to the north-west the Castle Peak Mountain.

"We now packed our horses and started back for Clinton, September 29th, arriving there 7th October, and bringing with us over 100 lbs. of rock samples from different ledges. We laid over at Clinton one day, and then started for Bridge River, *via* Lillooet. Went up the river to the North Fork prospecting, and brought back some silver-bearing rock. Returned to Lillooet and went up to Cayoosh Creek 5 miles, where we got samples from a ledge carrying large quantities of sulphurets, which we shall have assayed. We then proceeded up Fraser River on the west side, some 30 miles, where we found a small vein of very good looking sulphuret ore, close to the river The vein is narrow, but on assay, has been proved to be very good. We now returned to Clinton, October 24th, stayed there two days, and started for the west side of Fraser River. We went up Leon's Creek eight miles; found no quartz here. The top of the mountain here is a bed of lava, about 100 feet thick, resting on a bed of fine red gravel, some of it very loose. We packed some of this gravel down to the creek and panned it out; could get no gold, but abundance of black sand. We now went 6 miles below this creek, on Fraser River, opposite the Big Slide, found a small ledge of good looking sulphurets; brought a lot of it back with us for assay, for which we expect to have good returns. We

now returned to Big Bar. Our prospecting for this season is at an end, with what results we do not yet know. If unsuccessful, it is not our fault. We have done our level best in trying to find paying quartz ledges, and whatever the result, we believe British Columbia to be second to no place on this continent for minerals, and have no doubt in the near future rich quartz ledges will be discovered. We have prospected but little on our different trips for alluvial diggings, as our object in going out was to look for quartz. In our explorations on head waters of Bridge River, we saw no signs of any mining done by whites or Chinese, as we were far above them. We have, through the kindness of Mr. McLellan, had 15 samples of quartz sent for assay, of which, up to this date, we have no returns.

"In closing this report we desire to tender you our thanks for sending a number of our specimens to Victoria for assay, and sending the result of these assays to us.

"We have, &c.,

(Signed) "P. H. WARD,
"H. GOULD.

"*To F. Soues, Esquire, Gold Commissioner,*
"*Lillooet District, Clinton.*"

MR. HENDERSON'S REPORT.

"BIG SLIDE, November 26th, 1886.

"SIR,—At your request I give you a short history of the Big Slide Mines, together with a report of the development so far done.

"These mines, situated on the Fraser River, at the north-west foot of Pavilion Mountain, now comprising the properties of the Foster Gold Milling & Mining Company, were discovered through the enterprise of Mr. F. W. Foster, of Clinton. A piece of heavy sulphuret ore was given him by an Indian, in 1872, which assayed $28.50. Mr. Foster sent an old miner to try and find the ledge and locate it; this he was successful in doing; work was begun, and tunnels run to tap the ledge. In the lower tunnel this was done at a distance of 243 feet, and in the upper tunnel at 80 feet, at each point of contact a strong ledge of good quality was found. Mr Chenhall, a practical Cornish miner, erected an arastra, with which to work the ore; it was not built correctly and the limited supply of quicksilver was lost. 900 pounds of the ore were crushed at this time, the small portion of remaining quicksilver and amalgam yielded in gold $12.50, and a prospect could be got of the tailings nearly as good as before milling. This was the last work done on the mine until the past summer, when I put a few men to work taking out ore for shipment to San Francisco for treatment, to determine the value and best modes of working.

"The tests made in San Francisco were deemed sufficiently encouraging to organize a company and go to work in earnest. The approach to the mine being very difficult, a large outlay of money was necessary to build a road, over which to haul machinery, &c. This road is now completed, and the machinery for a modern ten stamp gold mill and clorination works are now on the ground; by the new year, if no unforseen delays occur, the mill will be erected and running.

"The mines are now being opened up for permanent work. The levels are being connected by upraises to insure a good circulation. Drifts are being driven on each level. In all parts of the mine so far worked, fine paying ore has been found, which improves as the mountain is pierced. Everything gives promise of an immense body of ore. The main vein is from 15 inches to 5 feet in width. The average value per ton is about $20 gold and $2.50 silver. By the method of reducing that will be used, 90% of the gold and silver in the ore will be saved, at a cost of mining and milling of about $5 per ton.

"Work goes on in the mine day and night, and by the time the mill is ready, the mine will be sufficiently opened to furnish all the ore necessary to keep the mill constantly at work.

"It is the intention of the company to enlarge the mill as soon in the spring as possible—the grading for the additional stamps is completed.

"Two desulphurizing furnaces are now in course of construction. There are on the pay roll of the company 50 men, employed as miners, carpenters, and men employed at the saw-mill.

"We have burnt a kiln of 67,000 brick; they are of a very fair quality, and will be used in the construction of our furnaces, &c.

"It will afford me much pleasure to make my next annual report, when I shall have the satisfaction of giving you the bullion product, which will demonstrate the fact of paying quartz lodes in British Columbia.

"Yours very truly,
(Signed) "GEO. HENDERSON,
"*Superintendent, Foster Gold M. & M. Co.*

"*F. Soues, Gold Commissioner,*
"*Clinton.*"

"Copy of Assay tests taken at the mine of The Foster Mining & Milling Co., Big Slide Ledge, by Geo. Henderson, Superintendent:—

No.	1.	Front vein,	80 foot tunnel	$ 68.00
"	2.	Main ledge,	80 "	31.02
"	3.	Best looking face,	240 "	118.91
"	4.	Sample vein,	240 "	36.19
"	5.	Sample, new strike,	80 "	15.50
"	6.	" "	80 "	10.24
"	7.	Fine dirt, upper vein,	free ore	8.24
"	8.	Sample, best looking,	80 foot tunnel	36.19
"	9.	Sample, poorest,	80 "	10.34
"	10.	Fine dirt,	80 "	10.34
"	11.	Upper drift,	Sky tunnel	8.24
"	12	Waste,	240 foot tunnel	6.20
"	13.	Foot wall,	80 "	35.16
"	14.	Pyrites,	240 "	70.27
"	15.	Fine dirt,	Sky tunnel	19.38
"	16.	Poorest,	240 foot tunnel	17.80
"	17.	New find, 5 feet thick		41.36
"	18.	New find, 3½ feet thick		23.26

YALE.

Kamloops Division.

MR. DODD'S REPORT.

"KAMLOOPS, B. C., 22nd December, 1886.

"SIR,—I have the honour to forward herewith the mining statistics for the Kamloops division of Yale district.

"Scotch Creek, falling into Shuswap Lake about 50 miles east of Kamloops, and referred to in my report last year, has become a new mining camp with prospects of future improvement. The creek is steep and contains large rocks which make the working expensive. The supply of water is abundant. The gold is bright and heavy and sells for $17 an ounce here. My estimate of $22,000 as the yield of this creek during the past season may be taken as approximately correct.

"Louis Creek, 35 miles from Kamloops on the North Thompson River, caused some excitement early in July, but after a few weeks' trial the prospect did not continue.

"At Stump Lake, near Nicola, thirty miles from Kamloops, there are upwards of thirty quartz claims located, with very encouraging prospects. Considerable work has been done on some of the claims.

"Mr. Beeton, of London, England, has succeeded in inducing capitalists to invest in some of the above mines. They have a manager of many years' experience, and it is probable that at no distant date the Stump Lake mines will be extensively and profitably worked and prove a source of wealth to the province generally and to this district in particular.

"I have, &c.,
(Signed) "WM. DODD,
"*Government Agent.*

"*The Hon. the Minister of Mines,*
"*Victoria, B. C.*"

Okanagan Division.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE,
"PRIEST'S VALLEY, 4th December, 1886.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the district of Okanagan.

"Mining on Cherry Creek appears to have revived a little during the past summer. Some thirty Chinese have been taking out gold, with what results it is impossible to tell; but I am informed by a reliable party who resides on the creek that only a few are taking out wages, whilst the remainder are only making a bare subsistence.

"A Cherry Creek Mining Company has been formed (Mr. John Merrett, foreman), to try and find the lost lead, and who is under the impression that by running a tunnel some 1700 ft. into the bench and hill he will in all probability strike the channel The company's means are limited, and I would suggest that every encouragement be afforded them by the Government to carry out their undertaking.

"Messrs. Hollingworth and McMillan, who have been prospecting the Kettle River and tributaries this past summer for placer diggings, returned with a very good prospect and recorded a discovery claim on Kettle River, returning to cut out 16 miles of a trail from the Monashee mountain to their claims, so as to enable them to pack in their winter supplies and prepare to work their claims early in the spring.

"I hear very favourable reports from the Monashee quartz ledge, and from reliable authority I am informed that machinery will be put on the claim to commence active operations next summer.

"The Mission Creek Hydraulic Company has made good progress this season, but owing to the winter having set in they had to abandon work until next spring. I am informed that they intend running tunnels this winter to prospect the benches, with a view of finding out if it will pay them to put a superior class of hydraulic apparatus on the ground next summer.

"They have been working to a very great disadvantage, having to bring the water a long distance by ditch and flume on to the benches.

"The company intend to thoroughly prospect their claim, which will necessitate the expenditure of a considerable sum of money, which they estimate at from ten to fifteen thousand dollars.

"If this company is successful in their undertaking I have no doubt that others will be formed, as there is a large extent of gravel benches which may give small returns for capital invested.

"A step in the right direction has been taken by the Government in having a survey made this fall for the construction of a waggon road from Blue Springs, Okanagan, to the quartz mines, and when constructed will open up that rich portion of the district which abounds both in minerals and a vast extent of good agricultural land.

"I have, &c.,

"*The Honourable* (Signed) "W. DEWDNEY, G. A.
"*The Minister of Mines, Victoria.*"

Similkameen Division.

MR. TUNSTALL'S REPORT.

"NICOLA, December 23rd, 1886.

"SIR,—I have the honour to forward the mining statistics for the past year connected with the Similkameen District, showing a total yield of $203,000.

"I regret to state that the favourable expectations entertained have not been realized. The prospects said to have been found in the Tulameen River and some of its tributarties were probably, in some instances, exaggerated, but in most cases were in accordance with facts, and well calculated to deceive the most experiened miners. Many of the most favourable localities proved to be limited in extent, and so 'spotted' as to render the labour expended thereon unremunerative, whilst some of the adjoining claims paid moderately well.

"This irregularity in the pay-streak may be attributed to the fact that the gravel benches situated at a higher level indicate the position occupied by these streams in the remote past when the gold was first deposited in their beds, from which, through the effects of erosion, they subsequently receded, leaving behind the precious metal in varying quantities until they reached their present location more or less exhausted of their wealth. Next summer will, probably, see these deposits prospected and their value determined.

"Granite Creek throughout a length of four miles, with some exceptions, has paid from $3 to $20 per day to the man. Accordingly as the creek becomes worked out the benches, which have all been taken up, will be mined. Since my departure from Granite City three of these claims have yielded from thirty to fifty ounces per week, and many more will be in operation so soon as dumping ground can be secured without interfering with the companies working in the creek.

"On South Fork, which is a continuation of Granite Creek, the various companies were compelled to suspend work, the heavy body of water encountered at a certain depth being more than they could contend against with the pumping appliances at their disposal. In sinking favourable prospects were found which would warrant the opinion that the same run of gold found lower down existed in this portion of the creek.

"The Mainland Company is engaged in drifting through a flat situated at the mouth of Granite Creek. The pay dirt is about two feet deep and thirty feet wide, lying on a bed of coarse sand, and pays from three to four ounces to the set of timbers. At the opposite side of the creek, intersecting the latter at right angles, the same gravel is found, extending under the town of Granite City, clearly indicating that it lies in one of the ancient channels of the Tulameen River formed at an early stage of its existence.

"This is a discovery which will lead to important results in tracing the location of this valuable deposit, which must extend several miles up the valley of the Tulameen, and which mining operations on the river have so far been unable to find. Mining on the above stream during the past season has not been, generally speaking, successful. The Homestake Company, about five miles above Otter Flat, obtained good pay for about three or four weeks in the spring, when it suddenly gave out and led to a suspension of further work.

"The Beaver Company attempted to test the deep ground, but the large quantity of water they had to pump prevented the shareholders from reaching the bed-rock. I understand it is Major Downie's intention to return in the spring with powerful machinery capable of overcoming all obstacles of this nature.

"The California Company has struck gravel on a bar below the mouth of Slate Creek, which yields from four to five dollars per day to the hand. The work accomplished by the San Francisco, European, Consolidated, and other mining companies has not been attended with favourable results. The Chinese, however, working below the mouth of Granite Creek, seem to have received satisfactory returns for their labour.

"Collins, Cedar, Slate and Bear Creeks have not turned out as well as expected, although they will attract a considerable number of miners next season, encouraged by the prospects previously obtained. The largest nugget found was taken out of Bear Creek, and weighed $320. The next in point of value, from Slate Creek, was worth $215, and several pieces from Granite Creek averaged from $90 to $100 each.

"Mixed with the gold found in this district, and possessed of a greater specific gravity, is a whitish metal which, at first, was thrown away under the impression that it was worthless. For a considerable time no definite idea could be procured as to its value. Mr. Jensen, of Granite City, who forwarded a sample to a cousin of his at Manchester, England, for analysis, has kindly supplied me with the desired information The metal is principally platinum, containing small quantities of iridium, osmium, and palladium. Its value depends on the percentage of the platinum, which varies in quantity, and may be considered as worth about $2.50 per ounce. The selling price at Granite City was 50 cents per ounce; so the purchasers will reap a handsome return from their investment. Little work has been done on the mineral claims recorded at the Government Office. Mr. Stevenson has cut a road to the silver mine on Hope Mountain, and he will carry on active operations next spring as soon as the snow disappears. A tunnel is being run to intersect the Paradis Lode at a considerable depth from where it crops out on the surface; but as yet sufficient work has not been done to give any definite opinion as to its importance.

"The Small Debts Court has proved a great convenience to business men and others as offering a speedy and an efficient remedy to creditors for the recovery of amounts to $100.

Before its existence, persons residing in localities remote from where a County Court was held frequently preferred losing the moneys due than incur the great expense and loss of time in attending to prosecute their claims. I would, therefore, recommend that its provisions be extended to the more distant portions of the district, and enable litigants residing beyond the distance over which it has authority to participate in its advantages.

"In conclusion, I may add that the health of the camp has been very good. Only two deaths occurred, the result of typhoid fever. About one hundred white men and one hundred and fifty Chinese will winter in the mines, which will probably afford remunerative employment the coming year to over four hundred men.

"I have, &c.,

"*The Honourable* (Signed) "G. C. TUNSTALL, G. C. & S. M.

"*The Minister of Mines.*"

REPORT ON THE CARIBOO QUARTZ LEDGES BY MR. KOCH, MINING EXPERT.

"*To John Bowron, Esq.,*
Gold Commissioner, Cariboo.

"SIR,—At your request, on behalf of the Government, I have made as careful an examination of that portion of your mining district, lying within a radius of about six miles from Barkerville, as my time would admit of.

"The time expended and expenses incurred are far in excess of the Government appropriations; but I became so deeply interested in the very encouraging outlook for the future, and the earnest anxiety of the residents of the district, together with the knowledge so fresh in my mind of the failure that was made in your laudable efforts to develop the quartz interests of the district during the year 1878, through the incompetency and jealousy of those under you, that I could not possibly terminate my survey with a cursory examination.

"I, therefore, have the honour to submit the following:—

"GEOLOGICAL FORMATION.

"I find the formation identical with that of California. Slate predominates, with belts of limestone, porphyry, granite, and perhaps syenite, with stratification tending north and south, with variations north-west and south-east, showing a continuation of the formation of the gold-bearing belt of California.

"The surface is somewhat broken and displaced, traceable, however, to glacial disturbances. The formation, I should say, was of the tertiary period; that, however, I shall leave for such eminent men as Professors Dawson, Bowman and others to decide.

"MINERAL-BEARING VEINS.

"While a large amount was done and money expended during the years 1878-9, but little has been done towards developing the veins. But two shafts have been sunk to a depth of 100 feet each, and several others 50 feet deep, while several tunnels have been run in on the veins, at a depth of from 20 to 80 feet from the surface; yet sufficient can be seen to come to the conclusion that many true fissure veins traverse the country, while even contact veins will, in my judgment, be discovered, as already evidenced. All veins prospected will not prove to be permanent and paying veins; in fact, some of the prospects will prove, as in all countries, to be spurs or feeders to a true vein; or they may be slips, slides or broken and detached pieces from true veins. In some cases they may be so encouraging to the prospector that much time and money may be expended on them before the fact is made plain that there is no vein, but only a feeder or detached mass.

"To avoid such unhappy experience as far as possible, I will suggest a possible, or partial, remedy further on. (See Mineral Survey.) Most of the mines that have been prospected to any extent have a north-west and south-east trend, dipping towards the north-east.

"While other veins deviate somewhat from that course, they also show well-defined walls and abundance of ore, notably the Island Mountain mines.

"Breaks, or slips, have occurred on the veins on Island Mountain as on other veins; but, so far as my examination extended, I think I am safe in saying that those slips and faults, as in other veins, do not extend to any great depth. The veins I have examined run from four and a half to twenty feet in width, while in some cases it is fair to presume that they are much wider than they seem; as, in some veins, so far developed, one wall is of a loose and broken nature, and may be only a stratum of slate interlined or separating one portion of the vein from another. In other words, a mine to all appearances carrying a vein of four and a half feet may, in reality, be a vein ten or more feet in width.

"COURSE OF VEINS COMPARED WITH PLACER DIGGINGS.

"In my topographical examination of the country, I could not help observing that, without exception, your extremely rich placers lay immediately below the quartz veins; as, for instance, if we start at the Lord Dufferin claim and follow the croppings, passing the old Proserpine, now called the California, and continuing along the vein in a north-west course, you will find, immediately below, or at the base of the mountain to our left, runs Williams Creek, which has yielded many millions of gold, much of it extremely coarse, intermingled with quartz; while to our right, at the base of the same mountain, runs Conklin Gulch, which also yielded large quantities of gold, as, indeed, both places are yet doing.

"Continuing along the course of the vein and crossing Williams Creek at the cañon until the summit going towards Lowhee is reached, we find Stout's Gulch lying to the left and below the vein. All know how extremely rich that gulch has been, while it is, even now, being hydrauliced far up the mountain side towards the vein. Following the vein over the summit dividing Stout's Gulch from Lowhee Creek, we find the latter has been rich; and within a very few days samples of heavy gold have been pounded out of quartz found while sluicing.

"In the vicinity of the Pinkerton claim the vein crosses Lowhee Creek and pierces the mountain, continuing towards the Jack of Clubs Lake, taking in the Enterprise, now called the 'Senator Jones,' and extension, 'Governor Perkins.'

"The vein, extending up and through the mountain, no doubt supplied Lowhee Creek with the coarse gold mentioned above; and as the vein crosses through the mountain, the gold found on the banks of the lake perhaps came from the same source.

"I think I shall warn venturesome spirits from attempting to pump the lake out in their anxiety to find gold.

"In continuing my survey, I find no source from which the rich diggings of Mosquito Creek derive their gold except from the large, well-defined, and continuous vein and cross-veins passing through Island Mountain. Returning to the Lord Dufferin, I was not surprised to find that Grouse Creek could not possibly have received its bounteous supply of gold from any other source than from the Bonanza vein, where it crosses Grouse Creek as it passes from the California claim and continues through the Lord Dufferin ground towards Antler Creek; and surely no one will question the source whence that creek derived its gold, when not a dollar is being mined above where the vein crosses either Grouse or Antler Creeks.

"I find it impossible to embrace the Burns Mountain in this report; but from observation and information obtained from P. C. Dunlevy, of Soda Creek—a disinterested person, I think—I am led to think that the Burns Mountain veins supplied the millions mined from Lightning Creek, no gold being found above a point where Mr. Dunlevy supposed the veins crossed the creek.

"While I may seem to have been somewhat exhaustive in my report on the above veins, I will say I have been shown samples of ore from what, at present, may be termed outside veins—notably the Steadman, Sergeant Lindsay, and other veins, reaching so far away as Sugar Creek—and they, without exception, show well-defined walls, and invariably prospect well in gold. Those on Sugar Creek, however, carry a higher percentage of silver than gold; and, beyond doubt, many veins exist not yet discovered. The country is thickly covered with weeds and moss, which makes prospecting or following veins somewhat difficult; but the day is not far distant, in my judgment, when many prospectors will be found busily engaged in uncovering good paying veins. Some will meet with success, while the dreams of wealth of others will, unhappily, never be realized. Such is too often the fate of the prospector, which can, in a measure, be palliated by the Government, as I will explain further on. (See Mineral Survey).

"I must not neglect to account for *supposed* veins carrying free gold, in some cases lying higher up the mountains than the true veins, which have but little free gold; notably one which was discovered high up—in fact, on the summit of the mountain above the B. C. mines.

"During the glacial period all was chaos. The irresistible force did not always choose its course and destroy the tops of veins and carry them down to creeks below. On the contrary, portions of a vein were in some cases detached and carried many miles and landed on some mountain top hundreds of feet higher than its original bed, as in the case mentioned. Instead of being ground and crumbled sufficiently fine to admit of being gradually washed to the creeks below, it was carried in an unbroken mass and deposited on the top of the mountain, as is often seen in the case of a jam or drift of timber in a swollen stream, where trees may be seen piled up many feet, and beyond the line of the jam. In such cases the elements have but little effect on the supposed vein, and it lies there undisturbed, while thousands of tons broken and ground fine have at the same time been washed to the creeks below.

"PAY CHUTES.

"I find those interested in the development of the quartz veins somewhat surprised to learn that a gold quartz vein, found to be a paying one, should not continue paying to an indefinite depth and distance. In starting a tunnel, for instance, on a vein, the miner may have a vein that will pay a handsome profit above mining and milling expenses; that body of quartz may continue for twenty or perhaps five hundred feet; or the miner may, after drifting on the vein twenty or thirty feet, find he has come upon quartz that will not yield him one dollar per ton. I shall not advise him what to do in such a case, but will say that, in California, if his walls continued perfect, the miner would continue bravely on with his drift, testing his ore daily; and the chances are strongly in his favour of again drifting into a pay-chute which may continue hundreds of feet, and yield richer ore than he had hoped for. The same thing can be said of sinking shafts. The miner may start a shaft or incline on his vein and, as he sinks, to his chagrin he finds, while his quartz continues abundant, that only that portion covering half his shaft shows gold, and as depth is attained his pay-ore has disappeared entirely. And now, if he will stop and reason he will discover that he has sunk through his pay-chute, and he will either return to the point where he lost it and follow it, or continue his shaft as deep as he chooses, and then drift towards the course to which it dipped when he lost it.

"I will instance the old Eureka mine of Grass Valley, California. A large amount of gold was taken from their pay-chute, which gradually dipped towards and to the Idaho claim, the owners of which claim then took possession, and it has produced millions; while they, in their turn, must, according to late advices, soon yield up the rich chute to the owners of the adjoining ground.

"FREE GOLD AND SULPHURET VEINS.

"I have been asked for an explanation why most of the gold quartz veins of California were free-milling on the surface, and why some of them continue so, while the veins of this district show mainly sulphuret ore?

"I do not know that any scientific men have given a positive reason why such is the case, thus leaving me free to express my opinion on the subject, perhaps thereby drawing from a more scientific or practical engineer a better reason than I can give.

"Lying so much further north than California, your country was that much more subject to the terrible effects of the glaciers which undoubtedly swept over this country in their course southward. Scientific men point out their effects in California, and why not I point out their effects here?

"I am of the opinion that your veins here, at present, would have been worked hundreds of feet deep had they been attacked before the glacial period and worked to their present croppings. In other words, I think the veins were, originally, free-milling, and that the original croppings stood hundreds of feet higher than the present level, and that the glaciers with their accompanying masses of rock, sweeping with wild and irresistible freedom, whirling and grinding through the country, have done for this country what stamp-mills have, to a great extent, done for California mines. I conclude that, with that powerful agency, the mountain tops, including the gold-bearing veins, were broken and ground down to the present level. The peaked snow-capped range lying to the north-east, and plainly in sight from the Prosperpine Mountain, helps to bear me out in my theory, it being, I take for granted, a hard rocky range, perhaps granite, and much higher than the gold-bearing range, withstood the

terrible charge from the far north much better than this range of mountains; yet even it has been battered against by some powerful agency, until its rocky spires reach, needle-like, far up into the clouds. If I am correct in my theory, we have accounted for the rich deposit of coarse gold intermingled with quartz found in the old and original bottoms of the creeks of the district; and while there is a difference of opinion as to whether more sulphurets were found in the old or the top channel, I find, from most reliable sources, that more were found in the top or present channel and side-hills than in the deep drifting claims, except in exceptional cases. That helps to bear me out in my theory that the tops of the veins were free-milling, that the glaciers ground and broke off the tops of the veins, deposited them in the creeks below with the gold in a rough and comparatively unwashed state, much of it being imbedded in quartz. The deposit was then covered with the great wash from the mountain sides, the gold seeking the bottom, the loam and soil floating to the meadows below, leaving the claim to form a new bottom for the creeks and benches and overlying the extremely rich deposits since drifted out. When the great maelstrom had ceased to whirl and grind, and the work of nature went quitely on, then the melting snows of winter and the summer rains continued the unfinished work of the glaciers by gradually washing the gold from the sides of the mountains, together with the decomposing sulphurets which the glaciers had reached and broken from the veins. The gold found in the present creek bottom on the clay, and that also found in the higher workings of the hydraulic claims, being, as a rule, much finer than that gathered from the old channel under the clay, made finer, no doubt, from its slow travelling down the mountain side. Of course, many large pieces are now found where they became lodged in the rocks or ravines during the glacial period.

"The same effect, I think, was produced in California; but the cause being less violent and the mountains not being so high, the veins were not broken and worn down to depth enough to reach the sulphurets, except in some instances.

"Why some veins in California continue to yield free-milling ore to a great depth, while, so far, none of any note have been found here, will be, in my judgment, as hard to explain as why, in some of the Comstock mines, the ore yields largely in gold with silver, while in mines on the same vein and not far distant the percentage of gold is small.

"I will cite some of the silver mines of Mexico, notably those on the peninsula fifty miles inland from the City of La Paz.

"On some of the veins the surface has been worked to a depth varying from ten to one hundred feet, for the purpose of getting the docile or so-called "patia" ore (an ore that is free milling and worked by an arastra), but at the above-named depths base ore, or so-called fire ore, is always encountered. That ore requires skill to extract the precious metals. And now that nature has been kind enough to mill the top or free milling ore from your veins, you must employ skill, combined with intelligence, in opening and working your mines and ore, in order to make mining one of the great industries of your country.

"With thirty-three years' underground experience in California, Nevada, Arizona, and Mexico, I will now state without any reserve that I have unlimited faith in the continuation of your veins to a great depth. My best guide in coming to that conclusion is the increase of the percentage of gold-bearing sulphurets as depth is attained; the ore in the two shafts that have attained a depth of one hundred feet being heavily charged with rich sulphurets, while the croppings showed but a small percentage, comparatively speaking, with more free gold visible.

"CONSOLIDATION OF COMPANIES.

"As all properties will not result in being mines, and to prospect any one of them properly requires time and money, I recommend that owners should, as far as practicable, consolidate and select any one of their claims, and unite their time and strength on it. When sufficiently developed, capital will then buy or incorporate with them and place the mine on a paying basis, and they can then attack another property. Owners of prospects must not sit idle and wait for capital to come and buy a quartz boulder or a ten-foot hole in the ground.

"REDUCTION OF REBELLIOUS ORES.

"Although I consider the reduction of your ores the only real matter at issue, I shall not dwell long on it; as the history of gold quartz mining and milling has been reduced to a science in California, and is well known by all metallurgists, and as such men must be employed, it is not essential that I should go into details.

"Your gold quartz is known as sulphuret ore—that is, from ten to seventy-five per cent. of the gold they contain is locked up in sulphurets.

"I will state that the only process so far found practicable by which they can be reduced is to wet-crush the ore as it comes from the mine; most of the free gold is saved passing over the silver plates in and outside of the battery. The pulp then passes over one of the several good concentrators, or vanners, now in use. The concentrator saves from seventy to ninety per cent. of the valuable sulphurets, fine gold, and amalgam that escape the plates while the gangue passes off. The concentrations thus saved then pass into skilled hands, and are desulphurized and chlorodized, when the gold is readily obtained.

"Where the ore is rich in sulphurets an advantage is gained in the crushing capacity of the mills, as in milling ore for free gold a wire screen of from forty-five to fifty meshes to the square inch is generally used, which allows a crushing capacity of about two tons per stamp of eight hundred pounds every twenty-four hours, while in crushing ores rich in sulphurets a screen containing about thirty meshes to the square inch is used, which gives the stamps a much greater crushing capacity. Such ores are not crushed so fine as free milling ore, as the sulphurets are easily reduced in the battery; and if a screen of from forty to fifty is used, the sulphurets would be reduced to an almost impalpable pulp, and much would pass the concentrator as slum.

"Trials of the best concentrators failed recently to prevent a loss being sustained in working the silver ores of the Comstock vein, as the chlorides passed off as slum.

"Mills of twenty or more stamps would, no doubt, erect their own chlorination works, and they could always be employed to reduce the concentrations of smaller mills, and the skilled labour would always find useful employment about the mill when not so employed. Wood being abundant, the ores can be handled cheaply.

"I may make somewhat plainer the process of reducing your ores by chlorination. After the sulphurets are carefully concentrated they are roasted until they are thoroughly desulphurized. Through the agency of chlorine gas, per-chloride of gold is then produced. Sulphuric acid, per-oxide of manganese and common salt, are the agents by which the chlorine gas is produced. Pure water then dissolves the per-chloride of gold, which is readily precipitated into a powder or flour gold, by the aid of sulphate of iron.

"PATENT PROCESSES.

"I must give you warning by calling your attention to the many processes being placed before the public, or before men not skilled in such business as mining and milling ore, for they are the only ones who can be led astray into such wild and impracticable schemes as some of the processes are.

"I will refer you to some of the failures, and if your memory does not serve you well in the matter, you can get full particulars from Wm. Ireland, jr., State Geologist of California.

"The first one in my mind was introduced by a man, I think, named Mears, in Chili, ten or more years ago. He became the rage in that great mining country. His process was, of course, a secret. His trials, like all such, were, however, public; even those likely to fall into the trap were invited to make tests for themselves, all with good results.

"Many wealthy men became bankrupt by buying mines which were too poor to be worked by ordinary process. The promoter was presumably interested in such sales. The matter became so public, and so many had invested their all, that an investigation was had, which resulted in the fraud being exposed and the promoter sent to prison, and, if alive, is perhaps there yet.

"Among the more recent patent processes is the Frier process. Some twenty-two years ago Meadow Lake district was discovered in the Sierra Nevada Mountains, about thirty-five miles from the Central Pacific Railroad. The veins were extremely large and well-defined; many of them rich. A large town grew up, as it were, in a day; mills built and mines opened, when, to the consternation of all, the ores were found to be refractory, and up to this time they have baffled the most skillful manipulators. About ten years ago a man named Frier gave out that he had discovered a process by which the ore could be worked. I, with many others, think that he was honest in his belief; but after men of means had spent thousands of dollars in the erection of reduction works, it proved to be an utter failure, and to this day the rich veins of Meadow Lake lie dormant. A San Francisco Company, by latest advices, are shipping in and erecting a mill to cost one hundred and fifty thousand dollars. Let us hope the mystery has been solved as to the proper treatment of the ores.

"A more recent process is one started some five years ago in San Francisco, and lately revived in Victoria. I had the satisfaction of investigating it some time ago, soon after it was made public. Small works were erected in Sacramento, but never started. It was taken east, and I was told that Jay Gould and other monied men, all ignorant of such matters, took stock and erected works in Colorado. If so, they quietly closed them down; not one of them is at work either in California, or, to my knowledge, in any other country in the world. Every mining man in the world would hail with delight such a process, if it were feasible.

"I cannot well afford to make the effort I am now making on behalf of your people and Government, and see my work hampered by having some patent process sprung upon the public and proved to be an unmitigated failure, after costing individuals or the Government thousands of dollars, and the fault be laid on the mines as being valueless. I refer those that have witnessed the process, and feel anxious to investigate, to such men as Wm. Ireland, jr., State Geologist; Professor Price, Assayer and Chemist; C. A. Luckhardt, of Nevada Metallurgical Works, and H. Kustell, Assayer, all prominent men in that branch in San Francisco. Either will be pleased to give them information on the subject.

"I must not let any patent process escape me for fear you may deem it applicable to your ores because I neglected to report or state my views on the subject. I therefore call your attention to an article in the *Mainland Guardian* of July 31st, 1886.

"I do not deny the possibility of saving the gold by the process referred to in the article; but the very fact of the pulp or ground ore having to pass over a bath of melted copper explains at once that the ore must be dry-crushed, that process at once reduces the crushing capacity of the mill over one-fourth as compared with wet-crushing; and the same per diem cost of fuel and skilled labour goes on. Next, in order to reach the gold, all the crushed ore, sulphurets, and vein gangue alike must pass over the molten bath, which requires fuel and skill to keep to the requisite temperature; as well also does it require skill to keep the pulp passing evenly over the bath; and lastly, when your gold is gathered you must resort to the expensive method of parting the precious metals from the copper, which process alone would go far towards desulphurizing and chloridizing as now done in California.

"DIFFERENCE IN COST OF MINING IN BRITISH COLUMBIA AS COMPARED WITH CALIFORNIA.

"In the absence of statistics, I will attempt to show the difference in the cost of mining and milling in California as compared with Cariboo, and the very probable results to be obtained from the energetic, careful, and scientific handling of your large and well-defined gold-bearing veins.

"Skilled labour, which includes mechanical engineers, smiths, mill-men, and chloridizers, costs, in California, about four dollars per diem. First-class miners and blasters cost $3, and second-class from $2.75 to $2.50; outside labour, including Chinese, averages $2 per diem. Wood, for steam purposes, will, no doubt, average at this time $5.50 per cord, while the ores milled do not, in my opinion, yield to exceed eight and a half dollars per ton. That estimate may seem small to a California miner, but when it is remembered the enormous quantities of low-grade ores milled by such companies as the Plumas-Eureka, Sierra Butts, Douglas Island, Doctor Zielie Mine, and many others, it greatly reduces the average as compared with the few stamps milling $12 to $20 ore. And yet the far-seeing capitalist of California finds investment in a quartz mine one of his best investments, and does not hesitate to erect the best machinery that skill can invent, whereby mining may be made a legitimate branch of industry; and my examination of your veins has led me to carefully study the situation as compared with the above. I find skilled labour, as above, will, perhaps, cost $6 per diem, good miners $4, second-class $3.50, while outside labour costs $3, and wood not to exceed $3 per cord.

"While I feel safe in placing the milling value of your ores at from $17.50 to $20 per ton, and I feel confident that those figures can be safely advanced from ten to twenty per cent., but I have endeavoured to be cautious in the examination of your mines and my statements to your people, and do not wish to cause them to feel over sanguine until milling results are reached. I have made the above estimates as to cost after talking with your most prominent citizens, and estimate the value of your ores after making over fifty assays from the different veins and carefully testing the feasibility of chloridizing the sulphurets contained in the ore.

"MINERALOGICAL SURVEY.

"I deem it of the greatest importance to the Province that a systematic mineralogical survey be made, not alone of this immediate vicinity, but of the outlying and surrounding

country. The survey should be so managed as to keep pace with the prospector, rather than neglect the work commenced by extending the examination too far beyond present work; for, by extending the survey beyond present developments, you deprive the prospector of the assistance and advice of your engineer.

"As I have previously stated, the Government can materially aid and assist the prospector in his work of development, and often save him much time and money by having an intelligent and practical engineer near by to consult and to advise him as to the best method to prospect his ground, and as to the probability of reaching pay ore.

"In this connection I will state that I see a Bill is presented before the House in New Zealand whereby it is proposed to appropriate one hundred thousands pounds to aid in developing the mineral resources of the Colony; while the United States has, perhaps, the most complete and extensive mineralogical survey system of any country in the world, and the result is—what? English and French capital come to the United States in preference to any other country. They read and have the mineral resources of the country explained to them constantly.

"Following upon the heels of the annual mineralogical report, enterprising men go to London and Paris well supplied with samples of ore and elaborate maps of mining property, and gifted with national go-ahead-itiveness and never-let-go, they annually induce a large amount of capital to come into California, Nevada, Colorado, Idaho, New Mexico, and Arizona. Not one of these States or Territories but have large English and French companies successfully at work; and the more capital they invest the better they are pleased in case it yields from six to ten per cent. per annum.

"That capital can be turned hitherward; not, however, by sitting supinely waiting for its coming.

"Ask an Englishman which he would prefer, Canada or the United States, and why, and he will answer—'The United States, because there is more dash, enterprise, and go-ahead amongst the people.' Including Alaska, Oregon, California, Idaho and Montana, mining industries have almost surrounded you, and the outside world scarcely knows that you are the possessors of such promising and well-defined gold and silver-bearing veins.

"Several years ago so eminent a man as Professor Dawson took with him to Montreal samples of the quartz broken from the croppings of your veins, and reported to you from five to six dollars per ton, and encouraged you to hunt in those veins for richer ore, as they were, beyond doubt, the sources of the many millions of coarse gold intermixed with quartz taken from your creeks and benches, and no richer placer diggings were ever discovered than your creeks and benches through which the veins pass. Do not forget that the mountain will not come to you; on the contrary, you must seek capital and give it encouragement, and the day will come when your district will again rank as formerly amongst the great gold producers.

"Capital at present is seeking investment in the most remote corners of the globe. All manufacturing industries are overdone. Silver is a drug upon the market and can scarcely hold its place as a circulating medium, while (including the product of the entire world) gold enough is not now produced to supply the arts and sciences. Then why not use energy and push enough to induce English capital to come to your district?

"In referring to capital seeking investment, I may refer you to the circumstance of an English company formed to work the gold quartz found in South Africa. In order to be well equipped in every detail, their mill was built in San Francisco, shipped overland to New York, thence to England, and transhipped to Natal on the South Coast, where it had to be hauled by cattle seven hundred miles inland. Also one of a hundred stamps and necessary amalgamating pans was built in San Francisco and shipped to Peru, where, by rail and mules, it had to reach the giddy height of thirteen thousand feet, near the summit of the Andes Mountains, to work a silver mine.

"MANAGERS OF MILLS AND MINING PROPERTY.

"I cannot too strongly impress upon the minds of those proposing to invest in, or operate mines in this district, the great importance of selecting none but the most competent of men for their managers. They should come with good reference as to ability and integrity.

"Favoritism, friendship, partnership, good honest men, and too old to work, and such like considerations that can be advanced for making appointments, which might lead to the ruin of a company, or, at least, the useless expenditure of thousands of dollars, should all be discarded. The day is past for appointing ministers out of place, highly educated physicians and lawyers, or rich men's sons just out of college, because their fathers are largely interested. Appoint

some man who has had years of experience of vein mining, one who has cost some San Francisco or Eastern company half a million of dollars by some blunder made years ago. He has had experience, and blushes, and wonders how he could have made such mistakes as he has. He will, even now, make small mistakes, but he is quick to discover and remedy them. Good men can be procured, men that have worked in and helped to open the finest mines in the world.

"A manager should be able to run an engine, know how to run a mill in all its branches, know when each stamp is doing duty, detect a loose mortar bolt, cut out any kind of timbers for shaft, drift, or elsewhere, sharp a pick or drill, and, in fact, he must be a miniature encyclopedia, and he must be honest, temperate, and kind.

"TUNNELLING.

"Tunnelling, as a rule, has caused disaster and ruin to many a promising mining venture, and should only be resorted to when a mine has been proved to be valuable by shafts and drifts on the veins, and then only after a careful calculation as to the difference in cost as between hoisting and pumping, and the cost of making the tunnel, always bearing in mind that when machinery of sufficient power to sink deep enough to justify a tunnel is once in place that the same machinery may have to come in play again when the ore above the bottom adit is worked out, and the difference of continuing the hoist above the tunnel and to the surface will be so small that, in rare cases only, is the tunnel a benefit. I allude to deep, and not to prospecting, tunnels.

"There are cases where tunnelling would be proper, notably, on the Island Mountain mines, after they have been fully proven.

"Instances can be cited where millions have been squandered on the everlasting tunnel business.

"I will cite the Silver Mountain tunnels, Alturas County, California, run in to tap *supposed* rich mines at a great depth; when a few thousand dollars and a good horse-whim and work immediately on the vein would have proven the ground. Coming nearer home, I may refer to the Burns Mountain tunnel, the St. Laurent and American tunnels. Not one of these was started to tap a body of ore known to exist. Had the St. Laurent and American tunnels reached and tapped the vein at a pinched or barren point, Mr. R. B. Harper's statement, that the vein was a continuous and good one, would have been unjustly condemned, for it is fair to presume that drifts would not have been driven on the veins one foot in hopes of finding a pay-chute, and the owners would have, perhaps, abandoned the property. To say they were surface prospect tunnels is absurd, as a small engine could be purchased and a much greater depth reached for far less money than the tunnels could be run, with the plant in place for deeper developing.

"Let the prospector endeavour to find a pay-chute and sink on it, never leaving the vein; if he can find no pay-chute on his vein, select a place, sink as deep as possible and drift on the vein hoping to find one.

"All work done on the vein is useful; all work done outside of the vein has, eventually, to be paid for with cash, or out of the vein when reached.

"MILL SITES.

"Great care and forethought should be exercised in the selection of mill sites, always aiming to have the mill below the lowest contemplated opening of the mine, then making allowance for an ore-house with capacity of from 500 to 1,000 tons of ore, as, in case of accident to mine-machinery or mine, the mill will be well supplied with ore. Then, below that and the ore crusher should be bins with capacity of at least several hundred tons of ore, so as to give ample time to repair any accident to the ore crusher.

"Below the ore bins come the self-feeders, one of the most useful adjuncts of the mill. Below them, and in front of the battery, come the plates and sluices; and last of all come the concentrators for the saving of the rich sulphurets and amalgam that may escape from the plates; so that it is not hard to calculate the fall necessary to select a good mill site in this country.

"ASSAY OFFICE.

"An assay office is on absolute necessity in a mining country, and more especially in this district.

"No miner, however skilful, can tell what his ore is worth per ton by looking at the sulphurets, and he will be greatly guided by his assays. Also, in case chlorination works are erected, the purchaser and seller of sulphurets would both wish to have samples assayed.

"I would recommend that an assayer be appointed to officiate in your very well arranged assay office.

"SURVEYOR.

"One of the most necessary and useful men in a mining district is a surveyor, one appointed by the Government; and if an assistant is required, which will undoubtedly be the case, he should be appointed by and under the Government appointee. Without a surveyor no miner is sure that he is not developing his neighbour's, instead of his own, mine. The surveyor saves endless and costly litigation.

"It is true, as a rule, we did our own surveying in Nevada with shotguns, but it causes an unpleasant feeling in a mining camp.

"After the prospector has done his preliminary work, and is preparing to do permanent work, he must have a surveyor. When the manager for a company has opened his mine he wishes to have an office map, or working map, of his own, to which he can add his monthly work; and also his company will wish one at headquarters, to which they can add the work as it progresses. The veins, so far as known, should be run out, and a large map of the district should be kept in your office, and its fellow in Victoria.

"I cannot too strongly urge the appointment of a Government surveyor. He would draw a salary and reasonable rates be allowed him for work done for individuals or companies. In time I think the office, as well as the assay office, would be self-sustaining.

"EFFORTS MADE TO WORK QUARTZ MINES IN 1878 AND 1879.

"The effort made to inaugurate quartz mining in 1878 was certainly laudable, and justified by so many large and gold-bearing quartz veins exposed, and while a more competent mining engineer could perhaps have been chosen, yet, I am pleased to say that Mr. R. B. Harper told you many plain truths in reference to your veins, and notwithstanding that it is possible he lacked experience as a manager he would eventually have piloted you to success. Being a mining community his mismanagement in reference to tunnels, mill sites, &c., would easily have been remedied, and I cannot possibly understand why the quartz mining industry was so suddenly dropped because another man employed by private parties condemned Harper and disdained his statements. That person was formerly connected with C. A. Luckhardt, a very eminent assayer in San Francisco, and it is fair to presume was a good metallurgist, and, in fact, he is at present conducting an extensive assay office in New York. I cannot understand why he attempted and continued to mill large quantities of ore by free-milling process when he undoubtedly knew that it was impossible to save the gold by such process. Nor can I understand why he erected a cupola furnace previous to his free-milling attempt.

"In examining the furnace, I find that he roasted the ore in bulk, or broken to the size of nut coal.

"All he could do, at best, would be to desulphurize the outside of each piece: but suppose he had crushed it, as he should, and desulphurized all the ore, even then he would not have succeeded in saving the gold by grinding in the amalgamating pans, simply because he failed to chloridize the ore after desulphurizing it. From my personal knowledge of the gentleman I cannot believe he was ignorant of the method required and universally adopted in California.

"Yet eminent Frieburgh students were, as a rule, complete failures in California and Nevada.

"I think it unfortunate that Mr. Harper was not sustained, and, while I am not aware that he has had the experience, or is capable of managing a mining property, yet I am well enough acquainted with him to say that a mining company might do much worse than employ him as underground manager of their mine.

"I refer to the failure of 1878-79, in order to point out that it was not the fault of the veins that such failures came about.

"EXTENT OF GOLD-BEARING DISTRICT.

"Owing to the short time allowed for this examination I can say but little as to the extent of your gold and silver-bearing district, and must confine myself to hearsay and my personal experience on Hixon Creek (some fifty miles north-west from this point), together with my

examination in this immediate vicinity. At Hixon Creek the formation is very similar to that of this district. A large quantity of float quartz is found in the prophyry formation, and has formed itself into the semblance of a vein in many places without, however, taking the precaution to encase itself in regular walls, as all well-regulated veins should; in other words the surplus or overflow from the vein proper is found as above described.

"Much gold has been found in that quartz; but in bunches or in small deposits.

"At the bottom of a shaft sunk to a depth of one hundred feet, a *contact* was found; that is to say, the point of conjunction of a slate belt and porphyry. True, no vein of quartz existed at that point, but it gave encouragement to seek further. A shaft sunk to a depth of fifty feet at a distance of one hundred and sixty feet from the former shaft, was pumped out, and, on examination, showed that while much work had been done on the quartz scattered through the porphyry, they had also drifted and tapped a true fissure, or contact vein, at a point of contact of slate and porphyry.

"It was quite encouraging, and it was decided to prospect further in hopes of finding a pay-chute of quartz.

"Being near the creek it was deemed best to sink and prospect at another point distant about fifty feet. A shaft was sunk, and at a depth of sixty feet a drift was started, and the vein was found at the exact point where it was estimated to be, and no vein in California has truer or better defined walls, It is quite possible a greater depth must be reached before paying quartz in large quantities will be obtained. Recent advices, however, are exceedingly encouraging, much rich quartz being now raised.

"I have dwelt to some extent on this special property in order to show to the satisfaction of all that your gold-quartz deposits of this district are not local, but that a regular and unbroken formation exists, and continues for many miles, and that true fissure and even contact veins of gold and silver ore can be found by intelligent prospectors.

"Mining, when conducted on the same principles of economy, and with the same business caution and foresight as are necessary in manufacturing ventures and other enterprises requiring investment of capital, is not more risky than other branches of industry, and I predict that the result of intelligent planning, patient and energetic work, will demonstrate that that branch of industry can be as successfully carried on in Cariboo district as in any other district on the Pacific coast.

"With timber in abundance and a climate equally good with that of Idaho and Montana, and veins of ore from five to twenty-two feet in width, what should prevent your district from being ranked among the gold producers? Surely no reason can be assigned why such veins will not pay if they will yield ten dollars to the ton, where much lower grade ore is mined and milled in California at a profit, with the cost as between the two countries so evenly balanced.

"I will conclude by giving you an extract from a letter from C. A. Luckhardt, Esq., Nevada Metallurgical Works, San Francisco, now in the hands of Mr. Joseph Mason, Barkerville, showing that after having worked samples of the ore sent from this district, he coincides with my statement as to the proper method of working your ores:—

"'It is impracticable to amalgamate the ore raw. This ore wants to be run through a battery (crushed), concentrated on a 'Frue' or other concentrator, and the concentrations 'want to be roasted and the gold extracted by clorination to obtain a good practical result.'

"I remain very respectfully yours,

(Signed) "GEO. A. KOCH."

PRELIMINARY REPORT ON ORES COLLECTED AND QUARTZ LOCALITIES EXAMINED DURING FIELD WORK OF 1886, IN CARIBOO DISTRICT,

BY AMOS BOWMAN, MINING ENGINEER.

"Entering our field of work in Cariboo this season by way of Quesnelle Forks and the North Fork of Quesnelle River and Keithley Creek, we followed the course of the gold discoveries in 1860.

"As it is impossible to avail myself of the assays of ores collected from about fifty different localities, which are in progress, or to make any systematic detailed report on quartz in general at this stage—while I am engaged in preparing such report—I can simply note for the information of those who are particularly interested, in a brief way, the veins noted or examined in connection with the placer mining districts to which they have a degree of relationship; and to make such remarks of a general nature as may be pertinent.

"PUBLISHED INFORMATION IN REGARD TO CARIBOO QUARTZ VEINS.

"Before 1871, when British Columbia became a part of the Confederation, no cognizance was taken of Cariboo, whether quartz or placer, by the officers of the Geological Survey. In that year Mr. Richardson visited Cariboo cursorily.

"In 1875 Dr. Selwyn passed near it on his way to Peace River without stopping to make any examination of the gold-bearing rocks. In 1876, while returning from an exploration of the northern interior plateau, where the railway surveys were then in progress, Dr. G. M. Dawson, accompanied by myself, made a passing visit to Barkerville, when the first specimens of Cariboo quartz were collected and analyzed by an officer of the survey—Dr. Harrington (Report of 1876–7, p. 477). In 1878, commonly referred to in Cariboo District as 'the time of the quartz excitement,' only one specimen from the district reached the laboratory of the survey through private hands.

"In the same way Cariboo quartz remained at the mining centre of San Francisco, on the outskirts of public interest and sympathy. The provincial record of quartz development in Cariboo so far made was during the 'excitement' and its collapse in 1878. It is to be found in the report of Mr. Harper and others to the Minister of Mines, and in the journals of the day.

"THE QUARTZ QUESTION.

"Generally speaking, the public attention was directed to placer mining exclusively, and to quartz only casually. The records of the Government assayers at Barkerville and New Westminster, in their time, whether intelligently kept, or kept at all, have not been published, nor preserved in any public bureau so far as I am aware. The quartz question may be said to have remained uninvestigated to a conclusion. Certain members of the British Columbia Milling and Mining Company, of the Burns Mountain, the Island Mountain, the Enterprise, and the Hixon Creek Companies, who might be creditably named for their interest in this connection, and others in their individual capacity, have studied the question with a degree of faith. Several experts have contributed to the information extant, mostly in private reports to companies and individuals.

"The present catalogue will show, amongst other things,

"WHERE DEVELOPMENTS HAVE BEEN MADE.

"It will be noticed that it is in situations accessible to the largest numbers of people around Barkerville and Stanley. With the exception of Hixon Creek, outlying districts which have yielded considerable quantities of placer gold, and are known to possess good looking ledges in abundance, have not received the same attention. I leave out of consideration the well-known occurrence of profitable ledges frequently in mountainous regions where there never have been any extensive placers. All the undeveloped districts that are named were overrun by intelligent men during the flush times of the placers; and the ledges existing were undoubtedly noted; but the men who made quartz discoveries could do nothing with them, and they are mostly long since gone out of the country.

"LEDGES NOTED.

"The numbers attached are the assay tags. Our specimens reached Ottawa a little before Christmas, and were given into the hands of the assayer early in January.

"It is to be understood that the ledges here numerated do not comprise, probably, half the number noted, nor a hundredth part of the really good ledges that a prospector might find in the Cariboo country.

"Bearings are all from the true meridian, the variation allowed being N. 26½ degrees E., as found by observation.

"QUESNELLE RIVER.

"No. 1.—*South Fork of Quesnelle;* mining flat at mouth of Rose Gulch. Iron pyrites, and hydrated peroxide of iron, in quartz boulders of placer mines. On the two forks of Quesnelle River there were many profitable placers not on bedrock.

"No. 2.—Quartz pebble containing fragment of oxidised pyrites, from gravel and cement bluff, quarter mile above bridge over North Fork of Quesnelle River.

"These two fragments while having little local significance, having drifted from their original position, will serve to point to the fact that boulders of *good quartz ore* are universal throughout the placer mines of Cariboo. *How far* and *in what direction* they have travelled can only be guessed at, however shrewdly. Were it otherwise the placer miner could walk at once to the original sources of the gold, which it is the object of the quartz miner to trace.

"No. 15.—*North Fork of Quesnelle*, a little below mouth of Spanish Creek. Chinese hydraulic diggings, near old tunnel into point (run for quartz). Ledges exposed in washing. Decomposed pyrites and yellow oxides. Assay not completed; body, 1 to 4 feet; irregular as to continuation.

"Above the mouth of Spanish Creek it is well known to all old miners that the placers never 'paid.'

"A mile and a half below it, there is a good sized ledge on which Mr. Stephenson and others have expended money; and which I failed to find.

"SPANISH CREEK.

"On Spanish Creek, Mr. James Moore informs me there is a ledge from 5 to 7 feet in width, about 1½ miles above the mouth, at the meadows, near the entrance of Black Bear Creek. It contains galena in streaks about an inch wide, and strikes N.N.E. Another, a mile up Black Bear Creek, is 6 inches wide, and consists of decomposed quartz. Above that, 1½ miles, on Black Bear Creek, is another, 4 feet wide, containing iron pyrites. These veins run in the same general direction. While working placers on Black Bear Creek, Mr. Moore frequently found pieces of pure galena weighing from 1 ounce to 10 lbs., and many quartz boulders containing galena. On Spanish Creek, only a mile above its mouth, there is a ledge 2 feet wide, not containing any sulphurets. A hundred yards above its mouth, crossing the North Fork of Quesnelle at right angles, there is a 3 foot ledge, visible at low water; contents unknown.

"Still another ledge is visible a little below the mouth of Spanish Creek, on the left bank of the North Fork of Quesnelle. Thus there are 7 or 8 of these ledges in the Spanish Creek country known to Moore, yet undeveloped and unprospected.

"ON DUCK CREEK.

"No. 19.—*300 feet above Forks Trail Crossing*—Galena with white and yellow oxides.

"No. 20.—Duplicate, with red oxide and opaline hornstone.

"Strike of ledge S. W.; attitude, vertical. Strike of country rock in the vicinity E. and W., dip N. A surface cut was made in 1878 on the north side of the creek, disclosing considerable quantities of galena. Body of quartz 2 to 4 feet wide. On an adjacent, discoloured bluff of country rock something of an excitement was raised 25 years ago, owing to placer finds supposed to have been traced to that vicinity.

"No. 14.—*Borland Ledge*, Duck Creek, two miles above trail crossing—Pyrites and quartz. Assay not returned. Assay by Mr. Hoffman of specimen containing a little iron pyrites, and, in parts, a little chlorite, gave of gold a distinct trace; silver, none.

"In the winter of 1878, the Chinese, supported by the merchant Ching at Quesnelle Forks, took great interest in this ledge and worked at and around it the greater part of the winter

without accomplishing much. After the 'collapse'—referring to the quartz excitement of 1878—Messrs. Borland and McNab went up to look at it, but did nothing further. It was believed to be rich.

"A body of quartz crops out, into which surface cuts have been made, on the north side of the creek. Strike, S.W.; attitude, vertical.; strike of slates in the vicinity, S.E.; dip, southerly 25°.

"SNOWSHOE BRANCH OF KEITHLEY CREEK.

"On Wednesday, July 21st, I left camp at Barr's on Little Snowshoe Creek, accompanied by Thos. Haywood, an old English-Australian sailor, 22 years a resident, and visited the several ledges and placer mines between that point and 'Yank's.' Thence accompanied by Messrs. Haywood and Smith, we put in the balance of the day in circling around the head of Little Snowshoe, including 'Yank's' peak.

"Specimens 3 to 10, represent ledges around Little Snowshoe Creek, which furnished two miles of rich placer ground.

"The quartz seen in this vicinity is in bunches of considerable size, sometimes not continuous or only in small veins.

"The ledges were found in the main unprospected; their volume, richness, and strike having been left pretty much undetermined. Something of a test was made at the Arastra Ledge by Mr. Haywood, in 1863. A tunnel was run in 90 feet, to within 18 feet of a shaft which was sunk down 10 feet. Mr. Haywood found gold in this shaft all the way down, from the day he commenced to work; the shaft was on the richest place found at the surface. His tunnel was on one side of the ledge, crossed it diagonally, and then kept alongside. About 40 feet in, was obtained the material seen on the two dumps. Various stringers, 3 or 4 inches in thickness, were crossed, besides the main ledge.

"Horseshoe Gulch Ledge was the second visited. The third ledge visited, is identical with the one on the little quartz knoll, noted by me in 1885, and may be called the Steele Ledge. The fourth ledge visited is near this, southward, under a cliff. It was never recorded. It may be called the Galena Ledge, from the fact that chunks of galena are found on the surface, immediately below. Mr. Haywood supposes that the galena in the Little Snowshoe placer mines is derived from it. The fifth was the 'Big Ledge' on the south-west side of Yank's or Snowshoe Peak, which may be called the Haywood Ledge from the fact that he took it up, and staked off 1,500 feet for himself, and 1,500 feet more for Joe Rawley.

"The only ledge ever found on Little Snowshoe, besides the Arastra in close proximity to the placers, is that on the point below Smith and Anderson's hydraulic diggings, where there is a Chinese cabin, 200 yards below Smith's. In 1874, Mr. Haywood ran a tunnel to find the high bed-rock bench of the channel; and found this ledge. It contained a good deal of galena, and he thinks gold. What struck him was, that it appeared to be the same kind of rock as the very rich quartz boulders for which the Little Snowshoe Creek placer diggings have been noted—containing galena and gold.

"The Arastra Ledge did not contain exactly the same kind of rock as these boulders; galena was lacking. Other ledges and stringers near, however, above and below the Arastra, contained galena. About 200 yards west of the Arastra, a ledge was found running south-west, which contained galena.

"A mile below the Arastra, and about 100 yards below Haywood's present house, on the east side of the creek, Haywood, in 1876, found a seam of galena an inch thick, in plumbagenous black slate along with a scraggly, sparry quartz, of little account. It was in the strike of the rock, running from S.E. to N.W.

"No. 81.—Little Snowshoe, head of Smith and Anderson's diggings, *boulder* containing free gold, visibly.

"No. 3—Little Snowshoe Creek, a little *below our camp at Barr's place.* Pyrites with a felspar (?) weathering red. This occurs in small veins in rocks cut through by the creek at this place.

"No. 4—*The Arastra, Haywood's discovery claim* above referred to, at the head of the Little Snowshoe. Decomposed pyrites in quartz and chloritic slate. Assay by Mr. Hoffman of specimen containing a little iron pyrites and chlorite, gave of gold only a distinct trace, and silver none. The same quartz honey-combed in places. Strike of ledge S.S.E., dip E.N.E. 45°, with rock, which is a gray slate. A tunnel has been run in to tap the ledge, something over 90 feet; direction, N. 6 E. This is known as the Arastra ledge, from the fact that an arastra was operated here by 'Live Yank' many years ago. Gold is visible occasionally.

"There is an abundance of quartz in sight. As the tunnel did not follow the quartz throughout, the developments are still insufficient to determine the continuousness and regularity of the ledge. In a hole 8 feet wide by 6 feet deep, there is chiefly quartz without any definite trend.

"This vein is the furthest up which is in direct connection with the rich placer ground.

"No. 5—Same locality, quartz, dark red mineral, is simply oxide of iron (?). Assay in hand.

"No. 6—Arastra dump; same locality as 4 and 5. Ferruginous quartz with chlorite and talc.

"The Arastra ledge was originally recorded as the Douglas ledge, after Sir James Douglas.

"No. 9—*The top of the hill*, 1,400 feet N.N.W. from the Arastra ledge, following the strike of the rock. This point is about half a mile east of 'Yank's ledge.' Galena, with whitish and yellow oxides.

"No. 10—Same location. Looking north, you see into the valley of the North Fork of Little Snowshoe. There is quartz scattered all over the top of the hill.

"No. 79—"*Snowshoe Plateau*, '*Yank's ledge*,' westward and probably parallel to Arastra A meagre ore; large body.

"No. 7—*Horseshoe Gulch*, forming the extreme north-easterly head of Little Snowshoe Creek. There are several ledges and stringers crossing this gulch diagonally in the strike of the slates; course, N. 30 W; contents of ledge, quartz and galena.

"No. 92—*Steele ledge*. Quartz noted on track survey along ridge between Little Snowshoe and French Snowshoe in 1885. Honey-combed quartz, and brown iron oxide, with blackish parts. Several bodies of quartz a few feet wide show on the surface, without much appearance of continuity, nor containing much mineral visibly. Developments, about 18 inches, sunk on ledge. This locality is about 200 yards east of No. 8.

"No. 8—'*Galena ledge*.' Supposed by Haywood to be in line with the Arastra ledge. S. 21 E. from Arastra ledge three-quarters of a mile. On a spur forming the north-west side of Yank's peak, one-fourth of a mile from summit. This is close to the Steele ledge, and is supposed by Mr. Haywood to be on the same ledge, and in line with the Skye tunnel ledge on French Snowshoe, which figured during the quartz excitement of 1878. It is a barren-looking white quartz. Specimen contains red and yellow oxides with quartz.

"AROUND SNOWSHOE PLATEAU.

"No. 91—*Holmes ledge*, Breakneck Ridge, head of Six-Mile Creek, Snowshoe Plateau. Zincblende and galena along with iron pyrites occur in black slates associated with gray slates. Strike east and west, attitude nearly vertical. It is in a comb of slate extending down from the mountain, the country rock striking N.W., dip N.E. 70°. Cleavage lines of large masses appear to correspond with the strike of the rock. Body of ore very considerable in the shape of nests from 3 to 6 feet in width, the continuity of which has not apparently been determined by openings.

"A little surface scratching was done many years ago. A sack of the ore was sent to San Francisco for a working test, which resulted very favourably, having yielded, it is said, a profit to the owner above costs of test.

"No. 93—Same locality. Galena and zincblende with white oxide Assay in hand.

"No. 11—*Cunningham-Harvey summit*, camp near trail. Charley Fenton's find. Fine-looking iron pyrites and brown oxide with blackish nests in quartz. Bunches of quartz and small ledges without apparent continuity.

"HARVEY CREEK.

"No 12.—*Harvey Creek Ironstone Ledge*, below falls of Harvey Creek one-quarter mile. Olive and bluish feldspar with iron pyrites. Over three feet in width.

"No. 13.—Same locality, 200 feet further down the creek; 3 to 10 feet wide.

"There is an immense body of mineral in these two places. Massive bodies of iron pyrites, weathered red on the surface, projecting on and crossing the creek. Breaking off, form large boulders, found in the placer mines below. Strike E. and W., dip N. 60° with slates apparently,

"BETWEEN THE HEAD OF KEITHLEY, MAIN QUESNELLE AND SWIFT RIVER.

"No. 94.—*Cariboo Mountain*, near transit station, on western end. A very barren looking white quartz, in some places stained light yellow. Specimen contains some brown oxide of iron and a black brown mineral not further determined. Specks of free gold are visible occasionally.

"No. 95.—Ditto. Strike N. 85 E., dip southward 80°, or, in other words, nearly vertical. It plunges down, and follows midway the steep northern escarpment of Cariboo Mountain, and is conspicuous above the surface from 6 to 12 feet in width for one-third of a mile. Beyond that, to westward and eastward, its identity becomes less certain by reason of neighbouring croppings. Although broken fragments are found to westward in the line of strike, the appearance is that of a diminution in strength in that direction. Cross stringers, however, occur plentifully. Country rock, grey slate. Three-quarters of a mile to the westward black slate succeeds the grey. Several miles to the westward, on or near the strike of the vein, Mr. Porter panned gold out of the surface dirt at a point where the mountain slopes down into the valley of Swift River.

"ROUND TOP MOUNTAIN AND CUNNINGHAM CREEK.

"No. 96.—*On Round Top* Mountain, comb of quartz or quartzite at transit station. Evidently too massive to be anything else than barren. The summit itself is mostly quartz or quartzite, which rises into peaks and strikes with the rest of the country rock; strike N. 80 W., dip northward 40°.

"No. 97.—*Big ledge* or *comb* of quartz, or quartzite, on the eastern member of Round Top Mountain one mile S.E. of last. Oxides of iron in small quantity with very little pyrites. Strike more to the S. E. than on the main summit transit station; dip also northerly, but steeper. Country rock, slate.

"This comb runs from one-quarter to three-quarters of a mile E. S. E. from our Round Top camp, striking over the summit of the eastern mountain. Slides from it on the north side form parallel bands of quartz, or quartzite, show oxides of iron in sufficient quantity to colour the side hill of the northern escarpment red; visible at a mile's distance.

"No. 28.—Cunningham Creek, near the *head of Sharp's Ditch*, two miles west of Round Top, and 100 feet above ditch. Iron pyrites nearly pure. Assay in hand.

"No. 29.—Same locality; ore more or less decomposed, with quartz; course, N. W. and S. E. with the rock; dip northerly less than 48°. In quantity there is considerable, but the continuousness of the ore body has not been proved.

"On Cunningham Creek a quartz vein *crosses the creek* just below the trail, crossing between Sharp's and the Harvey Creek summit. This was not seen by me.

"No. 21.—*Sharp's Diggings*, Cunningham Creek. In bed of creek iron 'rock,' with quartz and feldspar; assay not completed. It is called the 'Big Iron ledge,' and is an iron stained dyke containing pyrites.

"No. 22.—*Chinaman's Diggings, on hill-side*, west side of Creek, half a mile below Sharp's on Cunningham Creek. Decomposed pyrites; hornstone with iron oxide cement.

"Great numbers of quartz boulders like specimen are found scattered, indicating proximity to a ledge of good character, both as to quality and quantity. The diggings in 1886 yielded well. It is a side-hill gravel deposit of local origin.

"ON ANTLER CREEK.

"No. 24.—*Antler Creek*, "*Limestone Ledge*," one-quarter of a mile above Alex. Porter's cabin. Quartz with yellow ferruginous oxide. Assay in hand.

"Nearly opposite to this locality is Nugget Gulch, the name of which sufficiently indicates its origin. Quarts runs in the strike, or bedding of the rock. It is in small seams, except at the Limestone Ledge, where it is several feet thick. Nugget Gulch has been mined 1,000 feet up, but not prospected to bed-rock beyond. It runs in the direction of Cunningham Creek at a point one-third of a mile above Sharp's in the line of pay, Mr. Porter thinks, which strikes through McCallum's Gulch on Williams Creek.

"No. 25 —*Porter's Last Prospect*, middle Antler Creek; a little below the old town of Antler, on west side. Pyrites and brown oxides, with black parts in quartz. Assay in hand.

"Two ledges here shown within 50 feet of each other. This one is best seen above the trail,

several hundred feet back. Strike E.S.E., dip to southward 80°. These ledges show also in the creek, and beyond it several hundred yards E. S. E.

"No. 26.—Same locality. Quartz with yellow and white oxides.

"No. 27.—Same locality, ledge situated lowest down. Iron pyrites and brown oxide.

"Assay by Mr. Hoffman of quartz coated with oxide of iron, gave of gold distinct trace; silver none.

"Here is a large body of ferruginous material containing some fine looking quartz. Body and character of ledge cannot be determined without digging.

"No. 98.—*Pebble of ironstone* found in sluices of Yellow Lion Company, McBean's Flat. It is a jasper approaching in purity to hematite, but was probably derived from a pyrituous ledge. Wherever these pebbles are found on Antler Creek it is said there is gold found with them.

"ON GROUSE CREEK.

"No. 53.—'*Fountain Head*' Ledge, Grouse Creek. Pyrites weathered out of honey-combed quartz. Assay not completed. Strike, N. 50 to 55 W., dip northward 60° to 70° with bedding apparently. Width, 10 feet, in parallel stringers, separated by selvages. The vein does not show on the east side, but ought to go through the Ottawa Company's placer claim.

"No. 53-1.—*Lady Dufferin* Ledge, Grouse Creek. Quartz pyrites and iron oxide. Assay in hand. Strike, S. 65 E., dip northward 70° with the rock. Exposed by a tunnel 65 feet deep running S. 75 W. Width, 5 feet 9 inches. Rather barren looking quartz with iron sulphurets in stringers running into the hanging walls.

"On the east side of the creek the ledge is called the Lord Dufferin, and is exposed by a tunnel running S. 25 E. to a depth of 175 feet. Its strike, as seen at the surface, appears to be S. 25 E., dip northward 60°; but on entering the tunnel it is S. 80 to 85 E., dipping from nearly vertical to 50° northward—showing a displacement by a twisting movement. A porphyry streak of 6 inches divides the ledge. From loose pieces it is supposed that additional porpyhry dykes exist, and had, probably, a good deal to do with the disturbance.

"The country rock is a spotted blue slate which falls down in large angular blocks, often knotty in appearance.

"The Dufferin and the Fountain Head are well toward the head of Grouse Creek, half a mile above the placer mines. Adjacent to the placers at least one promising ledge is reported, now buried under gravel.

"AROUND WILLIAMS CREEK, NEAR BARKERVILLE.

"No. 54—*Proserpine* ledge at Wilkinson House, near Barkerville. Quartz and pyrites with chlorite.

"No. 55—Strike and dip, etc., not visible on account of the filling up of the shaft; supposed to be in line with Mason Avenue, which runs N. 47 W.; to Bonanza ledge N. 43 W. The strike of the soft black slates, taken 200 feet west of the Wilkinson shaft, was found to be N. 43 W., dip about vertical; hence the ledge here may be considered to be between beds. The shaft is 50 feet deep, and was sunk in 1864-6 by Wilkinson.

At a distance of 630 feet W.S.W. is the supposed Steadman ledge, a body of quartz striking east and west, with a southerly dip of 75°. It is in slates striking N. 33 W. and dipping north-eastward 65°, showing local irregularity in the attitude of the country rock, and an intersecting vein system.

No. 56—Proserpine ledge at Proserpine shaft-house, Williams Creek, Barkerville. Galena and iron pyrites mixed with chloritic slates and oxides.

"Assay by Mr. Hoffman of specimen containing iron pyrites and galena in a gangue of quartz and chlorite, gave gold, .787, silver, 20.738 ounces to the ton.

"No. 57.—Same locality, brown oxides with iron pyrites, bluish feldspar (?) and chlorite. No galena. Assay in progress.

"No. 58.—Same locality. Pyrites in 'slate,' said to have assayed very high.

"No. 60.—On the same ledge 700 feet east of the Wilkinson shaft is the Proserpine house, and 200 feet farther the Proserpine shaft-house. The shaft is 97 feet deep, and also filled with water. Mr. Forest states that the vein dips S. 75°, and is 10 feet wide. An average assay of the dump is said to have given $20.

"*Stouts Gulch* Hydraulic Diggings, near Barkerville. An assay by Dr. Harrington in 1876-7 of a specimen collected by Dr. Dawson from a 5-foot cross vein containing white quartz with iron pyrites, gave gold .335, silver, .131 ounces to the ton.

"No. 100—*Bonanza* ledge divide, between Stout's Gulch and Lowhee Creek, near Barkerville. Quartz, with polished 'slickenside' wall containing iron pyrites.

"No. 99—Same locality; quartz and iron pyrites, with graphite.

"An assay of south casing of Bonanza ledge by Dr. Harrington (Report of 1876-77, p. 477), gave gold, .064 ounces, silver, .023 ounces to the ton; of north casing, only traces of gold; and of blue quartz, containing slaty matter, only traces of gold.

"Specimens received at the survey office in 1878, containing white quartz, pyrites and some carbonaceous matter, gave gold, .554 ounces ($11.45); and gold .073, silver .335 ounces to the ton. It had been reported as containing $90. [Rep. 1876-7, p. 478.]

"A tunnel several hundred feet in length strikes the ledge 55 feet below the surface, and a shaft from its inner end 50 feet deep shows the ledge to a depth of 105 feet below the surface. Counting in the side stringers it is estimated to be 22 feet in width. Some galena is found in hanging wall: in the foot wall it is all pyrites. Country rock, slate; having evidence in places of fragmental origin. Mr. Forest also states that this rock was assayed in 1878 and reported to contain $90 a ton; and that subsequently the assays were reported erroneous. Mr. Harper worked some tons at Nason's mill and claimed that it paid $3 to $4 a ton, but did not get gold enough to make a bar. No rock from the Bonanza was crushed in Riotte's time, nor subsequently, beyond test samples.

"Strike of ledge, N. 48 to 63 W.; dip northward, 45° to 60°; strike of slates in tunnel, N. 65 to 80 W.; dip northward, 45° to 60°. The above are repeated trials at different places. Taking an average, that of the ledge would be N. 55½ W., and of the rock N. 72½ W. The strike of a large body of quartz on the surface several hundred yards east of the tunnel known as the Big Blowout, agrees, in the main, with that of the ledge in the tunnel. It is plotted on my track survey as W. N. W.; but Mr. Craib, who observed instrumentally at my request, reports it strikes N. 49 W. On the whole, I am inclined to think the Bonanza ledge runs in the bedding of the rock.

"*Steadman Ledge*, Richfield, Williams Creek. A body of about 4 feet in width can be seen near the bed of the creek, where it has been exposed by an open cut. Strike, N. 48 W., standing about vertical. Fifty feet from it the slate rock strikes S. 35 E. and dips north-easterly 70°; apparently in broken ground, as a hundred yards above it and about the same distance below it on Williams Creek, the slate rock strikes S. 65 E. and dips northward from 70° to vertical.

"A specimen sent to me by James Reid in December, 1886, obtained from a depth of 30 feet, assayed by Mr. Hoffman, contained, of gold, a distinct trace; silver, none.

"No. 101—*Hines Ledge*, Williams Creek, above Richfield. Quartz with pyrites and mineral resembling zinc blende. Assay in progress.

"A body of quartz several feet or more in width was sunk upon by the occupant of the adjacent cabin and Mr. Walker; depth of shaft, 6 feet; body of ore, 4 feet; direction of strike and continuousness unknown. It is at the head of the profitable placer mining on Williams Creek. The rock contained little or nothing.

"No. 68—*Sergeant Lindsay* ledge, Cariscraig, Richfield mountain. A uniformly white barren-looking quartz specimen, has fragmental quartz, with brown iron oxide in layer or band.

"Strike of main ledge N. 69 to 76 W.; side ledge, N. 81 W. Width of main ledge, 4½ feet; side ledge 2½ to 5½ feet. The main ledge dips S. 50°, and the side ledge is vertical. These two bodies form a single ledge at the foot of the hill, where the ledge has been opened, and diverge at a small angle to the westward. Country rock, grey slate, with an apparently flattish dip. It has a cleavage striking S.S.E., dip, easterly, 60°.

"Great bodies of similar quartz crop on all sides near this ledge, and show a continuance in many different directions by smaller croppings.

"No. 61—*Home Rule* ledge, O'Neill, Barkerville, Williams Creek, half mile west of lower town. Very yellow oxide, with dark, pitchy-looking mineral.

"No. 62—Same locality, duplicate with similar yellow earth, pyrites, and pitchy mass, along with limonite.

"Assay by Hoffman of a specimen containing an association of galena, iron pyrites and limonite, gave, gold, .020; silver, 6.562 ounces to the ton.

"No. 64—Same locality. Galena, with a reddish-brown oxide.

"No. 65—Same locality. Galena and pyrites, with other oxides white and yellow. Also, a horny-like mineral.

"The opening on this ledge is a hole less than 10 feet wide and deep, leaving the strike

and dip uncertain. Mr. Dooley, the first locater, considered it as running east and west. Mr. O'Neill, the present owner, considers it as running north and south, similar croppings occurring in both directions, basing his conclusions on appearances in the opening. These would indicate a ledge of about 5 feet in width, dipping east 80°, having prophyry in the foot and hanging walls. There is, however, a stringer of quartz extending through this prophyry in an easterly and westerly direction, dipping S. 75°, which may represent the Dooley ledge.

"The principal characteristics of the Home Rule ledge is its abundance of mineral in the shape of galena, limonite, pyrites, and their oxides. In these respects it is not excelled by anything I have seen in the district.

"At a distance of 250 feet south of Mr O'Neill's opening there is a body of mineralized quartz from 5 to 6 feet in width, striking N. 41 E. and dipping north-westerly 80°. Twenty feet to the east of that there is a confused body of quartz separated from it by prophyry. In the general direction from the Home Rule opening Mr. O'Neill has found other similar croppings between this and the mouth of Conklin Gulch.

"No. 66.—*Dooley Ledge*, Barkerville, Williams Creek, being easterly extension of last. Galena, pyrites, and limonite, with white oxide (of lead or zinc?) also greenish mineral (copper?) Assay in progress.

"Mr. Dooley's principal opening is about 500 feet east of the Home Rule opening, and the body of quartz disclosed, strikes N. 75 W., dip S. 70°; width, 3 feet. It does not show as much mineral. What there is resembles that of the Home Rule opening, except in the lesser degree of decomposition. The country rock in the vicinity, a spotted slate, strikes N. 80 west, and stands vertical. Probably, on further developments, the ledge will be found to run with the slate. On the brow of the hill, back of Sincox's dwelling, the latter strikes N. 75 W., and dips N. 75°.

"No. 85.—*Clear Grit* claim, Canadian Creek; 9 specimens collected by Mr. McEvoy, and 6 by Mr. Porter. Body, 5 feet. Strike apparently with rock—N.W.; attitude, vertical.

"ON LOWHEE CREEK

"*Enterprise* Ledge, Lowhee Creek. Assay of a specimen sent by W. Pollard to the Survey Office in 1878, containing white quartz pyrites, iron oxide, and slaty matter, gave gold, 20.096; silver, 4.929 ounces to the ton. Opened by a tunnel, about 350 feet long; body, 8 to 10 feet; strike, N. 62 W., vertical.

"No. 67.—*Jack Pinkerton's* Ledge, Lowhee Creek, near Enterprise Ledge. Quartz not containing anything, visibly. Polished vein wall. Strike, N. 59 W.; dip, northerly 85°; width, 9 feet. The ledge is about 200 feet north-west and parallel to the Enterprise; both running with the slate, which dips, however, S. 70° in this vicinity. They cross Lowhee Creek, about 2,000 feet below the Victoria upper shaft house. Strikes near the position of the Ralph Ledge, on Barkerville Mountain. The country rock is a finely laminated chloritic slate.

"These ledges, accordingly, do not lie in the extension of the Cariboo, or Bonanza; which, according to Mr. Jack Pinkerton, crosses this mountain about 800 feet to the south-eastward.

"On Lowhee Gulch, where the Enterprise and Pinkerton Ledges cross it, the slates have the same strike, S. 60° E., showing an unbroken country between; but the dip is less, being only about 40°, and the colour more greyish. Sincox, Jr., George Byrnes & Co., in 1878, drifted in quite a distance on a ledge at or near this crossing.

"The walls are remarkable for their perfectly polished slickensides.

"No. 83.—*Victoria Shaft* Ledge, Lowhee Creek. Peculiar quartz crystals, encased in galena. Supposed by Mr. Forrest to be the western extension of the Bonanza. The Victoria was tapped 100 feet west of the shaft-house, by a tunnel running magnetic north, which cut a body of sulphurets 2 feet in width, breaking off abruptly to eastward, in the direction of Bonanza.

"*Sam Crane's Old Store*—Stringers yielding $20 a ton.

"ON ISLAND MOUNTAIN.

"No. 52.—'*Lady of the Lake Ledge*,' on west shore of Jack of Club's Lake. Pyrites and quartz. Assay not completed.

"A tunnel was run in by Forest, Dunlevy & Co., some years ago; course, W. to N.W.; centinuity undetermined; body in places, 8 feet. Vein lost.

"No. 102.—*Fox Ledge*, Island Mountain. Iron pyrites, and quartz.

"No. 103.—Same; heavy with pyrites. Yielded colours of gold in oven after roasting. Strike of little ledge, W.S.W.; dip, southward 85°; strike of country rock, S.W.; dip, northward 40°. Assays of selected ore are said to have yielded $60 and $70 to the ton.

"No. 104.—At the *Wright Ledge*, near by, the tunnel runs in S.W., in the strike of the rock 150 feet, then S. 5 W. 170 feet; total, 320 feet. The ledge lies along the tunnel for the first 20 feet after entering it, then leaves the tunnel to the left. Country rock in tunnel strikes S.W.; dip, northward 30. Assays said to have yielded $50 to the ton.

"*Atcheson* ledge, between Fox and Wright Ledges. Galena.

"About 200 feet to the eastward from the mouth of the Wright and Atcheson openings, Mr. Walker, in 1869, run a tunnel S., 124 feet in length, nearly at right angles to these ledges, without striking them, showing that they pass more to the north; and, further, that the Walker ledge does not, as it should not, pass in that vicinity.

"No. 105.—*Walker Ledge*, Island Mountain. Honey-combed quartz, and brown iron oxide from decomposition, with glistening white talcose mineral, resembling mica. Assay in hand.

"No. 106—Same locality. Quartz, iron pyrites and greenish talc.

"The cut into the Walker ledge runs S. 50 feet, striking the ledge nearly at right angles. The ledge here strikes S. 75 W., and dips to southward 60°. A heavy body of quartz is in sight, varying in thickness from 3 to 6 feet. Strike of rock in cut near ledge, S. 60 to 65 E.; dip, N. 45°. A quantity of rock milled by Riotte in 1878 yielded $19.03 to the ton; but it appears to have been imperfectly roasted. The bulk of the rock worked was hauled to the Lane and Kurtz mill and not roasted at all. As it is pyrites, with very little or no free gold, it yielded only a few dollars to the ton.

"During the winter of 1885-6 Mr. Nason worked 3,000lbs. of ore from this ledge taken from the dump at the ore-house and obtained $19.70. Mr. Dunlevy sent a sample of the tailings to Pittsburgh for assay and got a yield of $61 to the ton

The Sadou ledge is opened by a short tunnel, several hundred feet to the westward from Walker's opening. It is a ledge crossing the above-named; strike, S. 30 to 45 W.; attitude, nearly vertical. Mr. Walker observed it as S. 14 W. magnetic, which agrees approximately with my observation. In 1878 a large smoke seen at Burns mountain ledge was in line. Strike of country rock, S. 55 W.; dip, northward 45°.

"Assay by Harrington, in 1876-7, of rusty quartz with mica slate from the Sadou ledge gave, gold, .175; silver, .802 ounces to the ton. A milk-white quartz coated with hydrated peroxide and pyrituous cavities gave, gold, .658; silver, .233 ounces to the ton.

"The Sadou claim runs 600 feet in the general direction of the ledge up into the mountain, taking in a width of 100 feet. It is owned in Paris. At the bottom of the cut there is evidence of a fault, in quartz lying near to, if not belonging to the ledge.

"*West of the Sadou* ledge, crossing in the south-west corner of the clearing, another cut, ending in a short tunnel, has been run into the *Walker* ledge. It is 420 feet westward from the ore-house. The slate rock strikes N. 75 W., and dips northward 45°; perhaps is a little disturbed. A bearing taken along its strike, as indicated by Mr. Walker from his developments here and elsewhere, was S. 79 W.

"About 500 feet further west, in this direction, the ledge is again opened by a cut which discloses a body 3½ feet in width, nearly vertical, or dipping slightly to the south. Mr. Dunlevy here owns an extension of 1,500 feet. The ledge is traced another 1,500 feet west, where it is known as Joe. Mason's extension. About a mile beyond that, to the westward, are the ledges elsewhere noted, having a similar strike at the head of Mosquito Creek placer diggings.

"Mr. Walker informs me that about 2,000 feet west of the Dunlevy cut, Flynn & Co., under the name of the Soda Co., have located a ledge which crosses the Walker, striking N.W. magnetic (= N.N.W. true), which is 4 feet wide, and yields an assay of $38 to the ton.

"No. 107—*The John's or Island Mountain Ledge*. Iron pyrites and quartz. Assay not completed.

"This is supposed to be identical with the Walker ledge. It is 830 feet east of the Walker opening, and within 1,500 feet of Jack of Clubs Lake. Strike, as observed in tunnel, N. 83 W.; dip, southward, 60° to 75°. Mr. Walker gives the strike as S. 50 W. magnetic, = S. 75 W. true, or 22 degrees more to the south than I found it in the John's tunnel

"The rock strikes W.S.W. to S.W.; dip to northward, 25 or 30 degrees.

"A well-defined pyrites ledge of 41 to 51 inches has been followed in about 50 feet.

"Following the strike of ledge at the John's tunnel eastward about 1,200 feet on Mr.

McEvoy's line of survey, in sight of Jack of Clubs Lake, and 300 feet back from it, additional bodies of quartz have been found, having a similar strike, but no continuity in the developments so far made. This extension of the Island Mountain or Walker ledge is claimed by Robt. J. Walker. The rock near the lake strikes S. 65 W., dipping northward 45°, accordingly agreeing with that of the John's tunnel.

"For several thousand feet here the quartz opened to sight, it will be observed, while not departing very widely from the strike of the slates, distinctly does not follow their bedding.

"The Walker ledge shows, wherever opened, every appearance of regularity, and continuousness in force. Its eastern extension at the John's tunnel or Island Mountain ledge, varies in strike from that in the neighbourhood of the Walker ore-house to the extent of 20°.

"The Island Mountain Company's operations during 1886 included the purchase of the Lane and Kurtz mill, and the grading of a mill site on Jack of Clubs Lake, at a point where the course of the western portion of the ledge would strike the lake, but 600 feet north of Mr. McEvoy's line of survey, where the John's tunnel ledge would strike it.

"From the John's tunnel it was proposed to deliver, during the winter, 1,000 tons of quartz and to add to the mill concentrators, and roasting and leaching appliances for its treatment. A working test of a sample lot from the John's tunnel, I am informed, yielded Mr. Craib over $30 to the ton.

"I have been asked the question: Whether the heavy expense of erecting a roasting furnace, along with concentrators, would be justified by the quantity of ore in sight? With tolerably good assurance this may be answered in the affimative, other considerations being favourable.

"ON MOSQUITO CREEK.

"No. 48.—*Saunders' Diggings*, Mosquito Creek. Quartz ledge in placer diggings. Brown iron oxide and white mica in quartz with a weathering feldspar.

"No. 49.—Duplicate. Iron ochre and pyrites, with nests of pitchy mineral and white mica. Assay not returned. Strike, N. 62 E., dip north-westerly, very steep. Strike of county rock, S. 75 W., dip northward 80°.

"No. 50.—*Flynn's Diggings*, Mosquito Creek. Float galena, supposed to come from adjacent ledges in diggings, or near them; accompanied by iron pyrites and iron ochre. Assay not returned.

"No. 50.—Flynn's Upper Diggings, Mosquito Creek. Quartz ledge or body, irregular in shape. Containing a white talcose mineral.

"These are the uppermost placer diggings on Mosquito Creek. Six hundred feet further up Mosquito Creek forks; in the forks a tunnel has been run into the hill 500 feet, intersecting two or three quartz ledges of moderate size. Their course is easterly and westerly. One contains a great deal of galena, and is probably the source of the numerous specimens of that mineral found in Flynn's placer mine. Another contains much sulphuret of iron.

"No. 51.—*Head of Mosquito* Creek, one mile above Flynn's cabin. Supposed Island Mountain or Walker Ledge. Galena with white and yellow oxides. Assay not returned. Course of ledge E. and W. magnetic = N. 64 W., dip S. Body about five feet.

"ON SUGAR CREEK.

"No. 30.—*Upper Ledge, in cañon* above Wiley's house, Sugar Creek. Quartz and iron pyrites. Assay not returned. Strike of ledge N. 80 E., dip northward 75°. On the south side of Sugar Creek a body of quartz 6 to 8 feet in thickness stands above the surrounding surface. On the north side there is a bench fifty feet above the creek, which was worked by Mr. Wiley 10 years ago. It yielded $4 a day near the ledge, and $2 a day away from it.

"No. 31.—*Lower Ledge, in cañon*, 150 feet from last, Sugar Creek. Contains little visible mineral, but a peculiar red weathering feldspar. Assay not returned.

"No. 32.—Same locality. Iron oxide and white mica or talc. Assay not returned.

"This strikes N.W. and S.E., and dips to southward 70°; accordingly crosses the last mentioned on the bench. At the edge of the creek on the east side there is a body of fully 3 feet in width, which appears to be a bunch; continuity doubtful.

"No. 33.—*Bench Ledge*, on east side of cañon, near Wileys, Sugar Creek. Iron and copper pyrites with malachite and pitchy mineral.

"No 35.—At *ditch water-fall*, above Wiley's house, Sugar Creek. Brown iron oxide in moderate quantity. Body two feet; strike, with slates, S. 55 E, but not following their bedding. It dips S. 60, while the slates dip north about the same amount. It yielded gold

appreciably in the sluices of the placer mines adjacent. Does not contain much mineral visible to the eye.

"No. 36.—Ledge at *Wiley's cabin*, Sugar Creek, passing under wood-shed. About 200 feet below last. Dirt from its vicinity thrown into Wiley's sluices yielded a different gold from that of the placers overlying, although invisible to the eye in specimens. Pure iron pyrites, with black coating. Body 2 to 2½ feet. Continuous thorough the diggings. It runs with the slate, apparently crossing the creek into the hydraulic diggings at Walker's tunnel.

"No. 37.—Same locality, stringer of pure pyrites about 5 inches wide found between last and preceeding ledges.

"No. 43.—Still another ledge crosses Sugar Creek about the middle of the *lowest placer bench* worked to bedrock, a quarter of a mile below Wiley's house. It is 4 feet thick, and contains an abundance of sulphurets. Strike, N.W. and S.E., vertical. Body 2½ feet.

"No. 38.—On south side of Sugar Creek, opposite Sam. Walker's cabin, in *Wiley's old diggings*, at mouth of Cooper's Creek, containing some conglomerate cement boulders. Quartz pyrites and brown iron oxide. A ledge of good body, 2 or 3 feet, and fine looking ore, but undetermined continuity. Placer ground was rich in its vicinity. Mr. Wiley attributes it to the ledge.

"No. 44.—Near Sugar Creek, about 2,500 feet up *Cooper's Creek*, there is a '*galena ledge*,' 2½ feet wide, weathered into a hollow which runs up the mountain side. It may be identical with the galena ledge crossing Sugar Creek a mile above Cooper's Creek. Galena and pyrites. Assay in progress.

"No. 45.—Same locality, white coating.

"No. 46.—Sugar Creek, towards *head of Cooper's Creek*, near last. Barren looking quartz with white mica or talc. Strike, S. 80 E., dip, N., nearly vertical.

"Cooper's Creek forks here. Up the S. S. E. branch one-quarter mile another ledge crosses, striking S. 50 E., and dipping southward 70°, in which there is nothing visible at the point of crossing. Mr. Wiley thinks it is the same ledge which shows on the point of the mountain about half a mile to W.N.W. in good body, containing at that place abundance of iron sulphurets.

"No. 49.—*Cooper's Creek*, a little over half a mile above its mouth. A 2½-foot vein containing plenty of mineral, pyrites, and galena.

"On *Mustang Creek*, which enters Sugar Creek half a mile below Wiley's, there are several quartz ledges seen crossing Isaac's placer diggings diagonally. They are two miles above its mouth. Mr. Wiley supposes them to be the continuation of the upper Cooper's Creek ledges,

"ON LIGHTNING CREEK.

"No. 78.—*Sam. Montgomery's* Ledge, Lightning Creek, near Stanley. Barren looking quartz. Assay not completed. Strike (from information), about S. 30 E. Body, 2 to 4 feet.

"Mr. Montgomery reports a ledge uncovered in the diggings at this place about 1876, which had a strike of S. 30 E., as nearly as he can recall it, and a width of 4 feet. It is, probably, identical with the ledge from which the specimen was obtained, cropping under the bluff on the south side of the creek, a little above Montgomery's cabin.

"At the timber shaft, about 100 feet farther up, there was uncovered a 'rotten ledge,' from 4 to 6 inches in width, which crossed the creek in the same direction. The diggers went down into the 'rotten ledge' 4 feet, all along its course, and washed the loose stuff. It yielded the best prospects in the claim. Montgomery got coarse gold out of it, $4, $6, and an ounce ($18) in weight. About 600 ounces of the coarsest gold in the claim was gotten out of the rotten ledge.

"No. 69.—*Lightning Creek, south side*, opposite lower end of Van Winkle Dump. A small ledge, or stringer of 6 inches, in strike of rock. Brown iron oxide in quartz, with chlorite and white mica or talc. Assay not returned.

"Strike, S. 72 W.; dip, southerly 40°. From this point, 300 feet down Lightning Creek was the richest placer ground on the creek. David Edwards, who cleaned the bed-rock after drifting, states that quartz was visible in considerable quantities in this claim. A large mass of it was found on the bench on the north side, about 200 feet below; but no ledge was visible under the creek, so far as he knows.

"No. 70.— *Lightning Creek, north side*, near Van Winkle Co.'s headquarters. Ledge on north side of road. Brown iron oxide, light yellow oxide of iron; and black substance. Assay not completed.

"Strike, N.W.; dip, N.E. 55°; thickness, 2 feet, with parallel seams of smaller size. This is on an island of bed-rock between the Point Claim (in the deep ground under the point) and the present Van Winkle Creek. Mr. Edwards thinks it is not in place. The rich placer ground included the Point Claim. In 1875, four picks here, working in two shifts, took out 500 ounces a week. There was considerable quartz in the Point.

"Above this, there are three or four more small ledges crossing Lightning Creek.

"No. 72.—*Perkins Ledge*, Burns Mountain. Galena and honey-combed quartz.

"No. 73.—Same locality. Nearly pure galena, with white and dirty yellow oxides.

"No. 87.—Same. Honey-combed quartz and chloritic slate; pyrites dissolved out. Dark brown, bluish, and black oxides.

"An assay by Mr. Hoffman of quartz carrying a little galena, gave gold, 2.625; silver, 3.033 ounces to the ton.

"Cropping at numerous places between the Reid Tunnel, Perkins Shaft, and the Burns Mountain Company's Tunnel, on Burns Mountain, there is a series of ledges, commonly from 6 inches to 18 inches, but often 3 feet or over in width, striking from N.N.E. to E.N.E., and generally, nearly vertical. The country rock in the locality varies in strike as much as 90°, while the ledges are rather uniform, keeping the general direction of the group or family of parallel ledges to which they respectively belong.

"The country rock graduates from slate to shale, altered from sandstone. It is a soft rock in places, silicified in others; and in the Burns Mountain Company's Tunnel is hard to drill.

"No. 90.—*Burns Mountain Company's Shaft.* Iron (and arsenical?) pyrites in honey-combed quartz; yellow iron oxide. Assay in hand. Strike of ledge N 36 E., as staked off by Mr. Jacques; attitude, vertical; strike of country rock, N. 35 E.; dip, south-easterly 30°.

"At their principal shaft the Burns Mountain Co. has sunk on a ledge 5 feet wide at the surface, to a depth of about 50 feet. In the last half of that distance the ledge suffered a break; the quartz diminished to 2½ feet, pinched out and came in again in considerable force; but its further continuity has not been determined. Selvage lines and gouge, with broken rock, filled the place of the broken vein.

"From a point on the northern slope of the mountain, 174 feet lower than the shaft-house, a tunnel has been brought in over 800 feet in length, to a point vertically under the shaft. Two series of veins were intersected, running N.E. and N. 30 to 36 E. respectively.

"During the season of 1886 they were drifted on, and prospected under the superintendance of Mr. Jacques, with a fair promise, as I understand, of finding a good body and paying ore as soon as the necessary connections are made.

"No. 71.—Burns Mountain Co. 'Silver Ledge.' Galena and pyrites. Strike, N. 30 E.; body, 2 feet; in tunnel very small.

"No. 74.—*Chisholm Creek*, near Stanley. Lowest ledges or stringers found near rich placer ground—just above Sam. Momtgomery's placer diggings. Small veins of barren looking quartz. Assay not completed.

"Strike E.S.E., dip northerly 50°; body 10 to 20 inches. The diggings were worked in 1863-4, and paid $50 a day to the hand—the richest on the creek. While those ledges may have contributed to that result in part, the probability is that most of the pay was due to ledges farther up.

"Two or three series with a similar strike are found between this locality and the junction of Oregon Gulch. Here a narrow vertical ledge crosses the gulch at its outlet, in a northerly and southerly direction, showing excellent ore.

"The '*Foster ledge*' is in this vicinity. It is tapped by a tunnel a hundred feet further up Chisholm Creek, and is not accessible. It was at one time the subject of considerable attention, founded on facts reported in connection with the placers in the immediate vicinity. Its strike is said to be south-westerly.

"ON HIXON CREEK.

"No. 110—*Quesnelle Company's* main shaft on *Washburn ledge.* Pyrites, grey copper, and oxides, with free gold in some pieces. Strike N. 46 W., dip north-easterly 70°, with country rock. Body from 6 feet to a few inches. Cross veins of less body, striking N.E. vertical, contain rich ores. The main shaft is 115 feet deep. The Mason shaft, several hundred feet N.W., at the base of the hill, is 40 feet deep; and the Koch shaft is 70 feet deep. Three more or less crooked and winding drifts have been run north-westward into the hill,

searching for a continuous ore body. Following bodies of quartz in several instances, their general course is in the strike of the slates, as given above. The oldest of these was run by Messrs. Buckley and Washburn, the next by Messrs. G. B. Wright and Coleman, and the last by the present company, under the superintendence of Mr. George Koch. The last mentioned is the only one open to inspection; starts from the bottom of the Koch shaft, and is 174 feet long. The others start in at the surface level, and are about two-thirds of that distance in length.

"From the main shaft drifts have been run along the strike in opposite directions, and also along the cross veins in opposite directions, and in other directions at different depths and in different places, amounting to a large aggregate of exploration. The lack of continuousness of the ore bodies heretofore found, and the smallness of the richer cross stringers, has been baffling; but the main shaft having been deepened, the company at last accounts was 'in bonanza.'

"RELATIONS OF QUARTZ VEINS TO PLACER MINES.

"Some striking facts will be noticed by the position of most of the ledges mentioned, with reference to the placer mines. It is impossible, however, to do justice to this subject in a summary way. Every old Cariboo miner has noticed the significance of the Bonanza and Proserpine zone of ledges with reference to the Williams and Lowhee Creek placers. The same relation exists in the Island Mountain ledges to the placers of Mosquito Creek; in the Fountain Head, Dufferin, and other ledges lower down, to the placers of Grouse Creek; and in the network of ledges enumerated to the placers on Sugar Creek. A similar system of ledges crosses the head of the paying portion of Hixon Creek and Little Snowshoe Creek. About the relations of these ledges to the wealth of the adjacent placers, it would seem there can be no reasonable doubt.

"Antler and Cunningham Creeks, it will be seen, have their ledges in suspicious contiguity, to say the least, to the placers of those creeks. The Duck Creek placers have a pretty distinct relation to the crossing ledges; and the same appears to be the fact with reference to the North Fork of Quesnelle and Spanish Creek.

"If the quartz prospector could be placed in possession of all the facts known to the successful placer miners, so many of whom have left the country, doubtless instances would be multiplied where the ledges plainly had a relation to the placers. As a general proposition this will scarcely be questioned. But there exists a supposed mystery, which formulates itself into the question—Why are the ledges which have been found so poor in the vicinity of such rich placers?

"REGARDING ASSAYS OF QUARTZ.

"This question can be answered, perhaps, in several different ways. The best way is to ascertain the precise facts, which will throw a good deal of light on the subject.

"It will not be amis in this connection to mention the general fact that a pound sample of quartz found at or near the surface of a ledge is not conclusive evidence that the adjoining cubic yard (or ton) of quartz contains a like proportion. An assay button of such a sample of rock, containing $9 to the ton, would weigh 1/4000 of an ounce, and be almost microscopic. Yet ore of that description, under fairly favourable conditions and good management, is capable of yielding hundreds of thousands of dollars per annum.

"It is also a fact not generally known, except to assayers, in regard to Cariboo quartz, that where there is an abundance of pyrites there is generally a good-sized button of gold. Where there is plenty of red dirt derived from decomposed pyrites the assay will most probably show plenty of gold. Where this has been knocked off from the specimen to be assayed and lost, there will be little. This may account for some low assays. Where the gold is not free the percentage of pyrites should be ascertained per ton, and the assay made of the concentrated pyrites.

"The creeks give the most reliable assays; and the reason for it is plain. As ores run in chutes and chimneys, with barren spaces intervening, the creeks have not tired in their work of exploration until they have torn out the necessary amount of rock to reach the richer portions of the veins, which contain the pay-ore.

"EXTENT OF DEVELOPMENT WORK.

"At the Proserpine and Wilkinson shafts little over a hundred feet of sinking has been done; at the Bonanza, a little over a hundred. At the Dufferin ledge, between two and three

hundred feet of drift has been run; at the Enterprise, about three hundred; at the John's ledge, about sixty; at the Burns Mountain, eight hundred. All the other openings in ledges, leaving out Hixon Creek some distance to the westward, amounts to a shaft or tunnel of generally less than fifty feet. In many cases these developments strike only at one point in the ledge. The number of ledges, in addition to those named on which developments have been made, is about half-a-dozen.

"REGARDING BODY AND CONTINUOUSNESS OF QUARTZ VEINS.

"The width or body of the quartz ledges in Cariboo is as great as in any other mining country. On Round Top mountain there is a body of quartz several hundred feet or more in width. On the north-west side of Yank's peak there is a belt many hundred feet in width, which shows great combs of quartz projecting above the surface and running in parallel lines down the mountain side. On Cariboo Mountain there is a similar comb, known as the Dominion ledge, standing prominently enough to be seen from Mt. Agnes, eleven miles away. Indeed, from almost any mountain in Cariboo ledges of this sort can be seen on other mountains many miles distant. It cannot be said that the *quartz* is lacking, nor that the ledges are *not wide*.

"It has been pointed out, however, as another mystery, if the gold is derived from the quartz veins, that the body or continuousness of the ledges in the placer belt appears to be lacking. To this, again, the best explanation and answer I can give is the actual size of the veins, as found, in connection with the facts regarding their strike and that of the accompanying country rock. Where so little has been done in drifting on individual ledges it is unsafe to build any theories on this subject or to accept any in regard to what we cannot see. The evidence, as it stands, is that in the line of strike, or within the narrow zone of slates accompanying the ledges, quartz reappears on the surface, in some instances for a number of miles. Most of the ledges show lines of croppings, traceable for several hundred yards to half a mile. I am not aware that the ledges of any other mining country whose reputation is established can do any better with as little search work as has been done in Cariboo.

"STRIKE OF THE LEDGES AND OF THE COUNTRY ROCK.

"One cannot expect a ledge to be continuous in a direction in which it does not run.

"If any one should wish to trace on the ground, or on paper, the strike of any given ledge, or of the accompanying rock in advance of what I shall attempt to do in my report, in order to arrive at any conclusions of interest to himself I have here given the more important data for comparison. A proper treatment of this subject requires much care, extensive observation, and a quantity of map work.

"The prospector who has not the means of following a lost ledge by developments underground, steers his course by the country rock, rather than by the compass. For though the quartz is *later in date of formation*, it follows fissures in the rock previously existing whose course is influenced, if not governed, by the material through which they pass.

"The courses of the Proserpine and the Bonanza, along with the Enterprise and the Island Mountain Ledges, are well known in Cariboo. They appear to be in the same general line of strike. It is certainly easer, as well as more gratifying, to arrive at the conclusion that they are one and the same ledge than it is to discover any more precise facts which might not tally. A ruler laid on the map only shows them roughly in line, including the diggings of Sugar Creek to the westward, and of Antler Creek to the eastward. It will be seen that there are divergences in detail, along with the general uniformity, which are of interest, as well as of importance, to the practical miner.

"THE ACCOMPANYING MINERALS

"Have not been given the attention they deserve, and are subject to revision, being only a transcript of the naming adopted on cursory inspection in the field. An examination with the appliances of the laboratory is in progress.

"CERTAIN CHANGES

'In the aspect of the quartz mining industry may be noted very appropriately. In 1876 when I first visited Cariboo the yield of the placers was falling off. The out-going stages were carrying away not only all the gold, but the best energies of the country. This process has been going on to the lowest stage. A few of the plucky adventurers of Cariboo willingly

remained. Some of them interested themselves in quartz. In 1878 the Provincial Government, out of regard for this interest, sent a Cornish miner of good name as such into the district to develop the ledges. In 1878-9 followed the 'collapse. It may be attributed, 1st, To the metallurgical difficulty encountered at the beginning without the necessary knowledge or experience. 2nd. To the pernicious influence of the Virgina City bonanza excitement of that time, which made stock dealing the basis of investment. 3rd. To the great cost of getting to Cariboo, and conducting the prospecting, and other initial mining operations. 4th. To a limited knowledge of the precise character of the resources of the country, resulting in a lack of confidence.

"Commercial depression ruled, and Cariboo was forgotten for a while. In its northern remoteness, its isolation in winter, the population seemed to be deserted by the rest of the world. In spite of the great discouragement to permanent mining, Cariboo has retained a considerable white population of the intelligence and energy characteristic of the better days of a gold mining country. Problems of development have been working towards a solution under conditions that may be described as heroic. A Chinese population, in quality far superior to that of the coast, grew in numbers and prosperity, until it became the mainstay of the country. At the present time perhaps the Chinese wave is receding. Railway investment has become justified. It is taking the initial steps to bringing Cariboo into the world of industry, peculiar to the Cordillera, in which it is destined to take a foremost rank.

"Contemplating these changes it is not difficult to see the improved conditions of the present time.

"TRANSPORTATION

"Of materials and supplies in connection with mining developments is a factor of the first importance. Hixon Creek is easily reached by steamboat connecting at the mouth of Cañon Creek with a nine miles sled road, constructed in 1885-6. Lightning Creek, Island Mountain, Williams Creek, and Mosquito Creek are already connected with the waggon road system of the interior, Grouse Creek and Antler Creek are easily reached by an existing sled road of four and nine miles respectively from Barkerville. Both of the sled roads mentioned can be made into waggon roads at a moderate cost.

"Sugar Creek can be reached with easy grades by a waggon road of six miles from Mosquito Creek, where there is a good trail. Snowshoe, Keithley, and Spanish Creeks, and the North Fork of Quesnelle, at present connected with the 150-Mile House from the south, and Antler Creek from the north, by first-class trails, present no serious obstacles to the construction of waggon roads in either direction; but from the south would have to be approached by way of Horsefly Valley and Hazeltine Creek.

COAL.

The following table shows the output of each year from 1874 to 1886, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070
1885	365,000
1886	326,636

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.,
"1st February, 1887.

"SIR,—I have the honour to lay before you my report as Inspector of Mines, for the year ending 31st December, 1886, as required by the 'Coal Mines Regulation Act, 1877.'

"The collieries operated in the year 1886, are the following:—

"Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.

"Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons.

"East Wellington Colliery, owned by R. D. Chandler, Esq., of San Francisco.

"There has not been any work done at the Alexandra Colliery, which was started in 1884, in Cranberry District, by the Esquimalt and Nanaimo Railway Company.

"The output of coal for the year 1886 amounted to 326,636 tons, as follows:—

Nanaimo Colliery	112,761	tons.
Wellington Colliery	185,846	„
East Wellington Colliery	28,029	„
Total output in 1886	326,636	„
Add coal in stock 1st January, 1886	25,653	„
Total coal for disposal in 1886	352,289	„

"The exports of coal for the year 1886 amounted to 249,205 tons, as follows:—

Nanaimo Colliery	79,637	tons.
Wellington Colliery	144,526	„
East Wellington Colliery	25,042	„
Total exports for 1886	249,205	„

"This quarter of a million tons of coal was shipped principally to California, but shipments were also made to Portland, Oregon; Alaska, Petropavloski, Mexico, and the Hawaiian Islands; besides which, coal for fuel has been regularly supplied to the ocean mail steamers, gunboats, and vessels calling.

"In order to arrive at the total amount of sales for the year, the sales of coal for use in this Province must be added to the tonnage of the exports; but as these local sales are included in the returns of coal under the heading of 'home consumption,' aggregating 85,787 tons, which comprises the coal consumed in the colliery furnaces (excepting in the East Wellington return), I can only refer you to the returns.

"The following comparison of the aggregate output and export of coal for the years 1884, 1885, and 1886, will give at a glance an idea of the fluctuating character of our coal operations:—

	Output.	Export.
1884	394,070 tons	306,478 tons.
1885	365,596 „	237,797 „
1886	326,636 „	249,205 „

"From the above it will be seen that the output of 1886 is below that of 1884 and 1885, considerably below the former; and, also, that the exports of 1886, while exceeding that of 1885, is far less than that of 1884.

"The year 1884 was one of unprecedented prosperity in our coal industry, both in volume of trade and prices realized; but the drooping figures of the succeeding years, with the lower rates which our collieries have had to submit to in return for their product, urge me to again bring before your attention the necessity for the adoption of some active measures for the relief of our collieries from the imposition of 75 cents per ton levied in the United States upon our coal when it enters their ports. With the removal of this inequitable tax by a judicious reciprocity treaty, our coal industry will at once recover itself, and years unexampled in activity and progress will become our happy lot. We begin the year 1887 with 25,653 tons of coal 'stock in hand' at the collieries.

"The following statement shows the position of British Columbia in the chief market for the produce of our mines for the past four years, and according to the outlook the position of our Province as an exporter to California will be fully maintained during the year 1887:—

	1883.	1884.	1885.	1886.
	Tons.	Tons.	Tons.	Tons.
British Columbia	128,503	291,546	224,298	253,819*
Australia	174,143	190,497	206,751	287,293
England and Wales	131,355	108,808	170,656	160,869
Scotland	21,942	21,143	20,228	19,795
Eastern States (Anthracite, &c.)	43,861	38,124	29,834	19,517
Seattle	139,600	125,000	75,112	57,552
Carbon Hill	140,135	122,060	157,241	124,527
Green River and Mount Diablo	76,162	77,485	71,615	90,664
Renton, Newport and South Prairie	43,600	60,413	67,604	73,654
	899,301	1,035,076	1,023,339	1,087,690

"It will be seen that the importations of the State of California in 1886, were larger than for any previous year; the market there for coal is steadily increasing in capacity for absorbing our product, which is a most encouraging feature in our future prospects.

"Our collieries are equal to the supply of coal of first-class quality for steam, gas, or household purposes, sufficient in quantity to meet the requirements of all markets at present within our reach; with harbour accommodation, wharves, and dispatch in loading, second to none.

"We are looking also to the establishment of the great ocean mail service between this Province and Australia, China and Japan, as introducing an additional customer for our superior coal, and I trust our expectation in this respect will soon be realized.

*These totals represent the quantity of coal actually *received in* San Francisco, and other ports in California, during the years indicated, not necessarily the quantities *shipped to* those ports *in* the years named.

"NANAIMO COLLIERY.

"This colliery, as has been the case with all the other collieries in this district, has not been worked very steadily during the past year, on account of the dullness in the coal market.

"The Douglas Pit and the New Douglas or Chase River Mine, have 'stopped working,' and the machinery, rails, and dumps are all taken out. These mines are now filling, or are full of water.

"No. 1 Pit, Esplanade, Nanaimo.

"This is a mine mentioned in a previous report, and belonging to the Vancouver Coal Mining and Land Company (Limited). Everything about this mine, both on the surface and underground, is done in the strongest and most workmanlike manner. The workings about the bottom of this shaft having been already reported upon by me, I need not again describe them.

"The level on the south side of the shaft is yet standing idle.

"The level on the other side, known as the North No. 1 Level, has not been working steadily during the past year, except when it was necessary to make repairs. The company have had great difficulties to contend with in this level, in the shape of faults and wants in the coal, yet they persevered until they have got this level at the face over 1,500 yards in from the shaft, and under the water of the harbour nearly all the way. They have not yet got good coal in the face of the level, as they are trying to get through a fault; but the stalls, in a few yards after they leave the level, get over the fault and get into good coal, where the company have now got quite a large piece of it opened out, which proves to be very good and hard, varying in thickness from 6 to 10 feet, so that once the level, or main gangway, gets clear of the faults and into the good coal they will soon be able to make a large opening, which will greatly increase the output of coal.

"There is also a slope in this mine (mentioned in a former report). This slope is now down over 1,000 yards, going direct under the water of Nanaimo Harbour, with about 850 feet of rock, etc., intervening, so that little or no water comes from the roof, and what does come is free from salt. In this slope, as in the No. 1 Level, there is much ground which will not be profitable to work, and at present the coal is not very thick at the face of the slope In this slope have been three levels on each side; those on the north side are known as No. 2, 3, and 4, north levels, and from those levels the company take a large amount of coal daily; although there are many bad places, yet when the coal is good it is generally very thick, and turns out well. On the south side the levels are known as No. 2, 3, and 4, south levels. About 50 yards down the slope to the south side there branches off what is called the Diagonal Slope at an angle from the Main Slope of fifty-four degrees; this slope intersects with No. 2 and 3 levels. The engine at the top of the slope takes away the coal from these places, causing a great saving of labour in not running the coal to the main slope. The coal down here is very thick sometimes; at one time they could not tell how thick it was, as they could neither see top nor bottom; this slope is being pushed ahead, so, also, is the No. 4 Level, which is near to the bottom of the main slope, and eventually this level will intersect the Diagonal Slope, when the engine at the top will also take away the coal in place of running it out to the Main Slope by men or mules. As you will have observed there is very much ground that is not workable, yet the company are now sending out over 800 tons of coal per day, with prospects of improving.

"Ventilation is good; the motive power has been a furnace in connection with a steam jet, and the engine at the top of the slope exhausting into the No. 2, or upcast shaft. When I was down on the 23rd December there were 45,000 cubic feet of air in circulation per minute for the use of 118 men and boys; here the ventilation is on the separate split system, the main division being from the slope, taking the levels on either side as the intake returning by the way of the stalls, and as the pure air gets to the lowest place first, it is gradually on the ascend after it leaves the slope.

"There is now very little gas seen in this mine, but sometimes the firemen come across a little of it, and the appearance of a little reminds them of the necessity of being very careful.

"You will have noticed that I stated that the motive power of the ventilation has been a furnace and steam jet, but now it is a suction fan of the largest size. This fan has been erected about 100 feet from the upcast shaft, where an excavation has been made to the depth of about 18 feet, and continuing the excavation from the fan to the upcast shaft with a down grade going to the shaft. This part of the airway has been heavily timbered and planked, and

covered over with fine ashes, so that everything may be closely sealed. This fan has been put up at a great expense to the company, but they could see that it was what their extensive mine required, and they have got a machine which, I expect, will ever do the requirements of this mine. The diameter of the fan is 36 feet, and its width 12 feet; it is worked by an engine of 26-inch cylinder with 30-inch stroke; the engine, and nearly all the machinery in connection with the ponderous machine, came from England, and it is a relief to the company, and also to the manager, to know that they have got appliances to keep in motion all the air that will be required to dilute all noxious gases that this extensive mine is likely to give off. This fan is now a running machine. I know this, but have not tested it. The manager, Mr. W. McGregor, has, however, tried its power on different occasions, while running quite slow, and he never found less than 60,000 cubic feet per minute.

"Everything about the mine is kept in good order, and no expense is spared to make it safe (as far as can be seen); there is always plenty of timber and every other material on hand that is necessary. It is to be hoped that this valuable mine, after all the expense the company have been put to, will yet be a financial success, which will be good for the Company, the people of Nanaimo, and the Province in general.

"It will be interesting for me to add that in this mine, at the bottom of the No. 2 or air shaft, the Company have been prospecting by putting down a bore-hole with diamond drilling machinery. Here they have been very successful, for at a depth of 70 feet below the bottom of the shaft, or 700 feet from the surface they struck coal, which this bore-hole proves to be 6 feet thick, good and hard: and on testing some of the coal that was got out of the hole as to its gas making qualities, it was found that it was equal to the Douglas coal. This bore is being continued and is now down 100 feet, and there are yet very encouraging prospects of finding another seam of coal. I have good authority to say that when this hole is stopped, at no distant date thereafter the Company will start to sink the shaft and push it with all haste down to the coal or coals that may yet be got at, and it is to be hoped when they get their shaft down that the coal will exceed their expectations, both as regards quality and regularity This is a valuable discovery to the city, and a place where a great many will be employed; it will also be beneficial to every person about the town and in the Province generally. Last, though not least, it may be a reward to the Vancouver Coal Company, which has been so liberal in furnishing the means to search for and find such hidden treasures.

"SOUTH FIELD MINE.

"This is also one of the Vancouver Coal Company's mines. During the past year this mine has been about at a stand, except so far as the keeping out of the water; but that is no fault of the mine; the officers of the Company found they could supply the demand from their other mine. The mine stands to-day almost as it stood a year ago, when the miners brought their tools out, and when the market revives, which I hope will be soon, the Company will be well prepared, as they will be able, to start work with two days' notice and have an output of coal the first day.

"WELLINGTON COLLIERY.

"Belonging to Messrs. Robert Dunsmuir & Sons. The Wellington mine is the original of the Wellington Colliery; this mine has been in operation for about 16 or 17 years, and now it is getting nearly worked out, not on account of the coal being done, but owing to other mines cutting off all round.

"This has been a valuable property, and is yet. During the year that is past the work has been principally at the pillars (of coal) and other coal along the outcrop; all the lower levels are now finished and they are now working at the pillars in the upper levels, which will continue to give a good supply of coal for quite a long time yet. The coal that is being got out is of the best quality of the Wellington coal and similar to what was got out 12 or 14 years ago, this being the coal they went through and left to support the workings behind them.

"Ventilation is good; motive power, a large furnace, with two air shafts or outlets; gas is seldom or never seen here, except on some occasions, as when a large 'cave' takes place. The fireman examines all the mine, by night as well as by day, to see if any of the caves let off any gas, and that none collects, and to report to the workmen whether or not the mine is in a safe condition for them to proceed to work. In connection with this mine there is what is

known as the Adit level, that is a level going out into the valley of the Millstone River; the coal being taken out that way. Here there has been considerable idle time, as the coal trade has not been in a condition to work it steadily; but here, as in all the other mines belonging to Messrs. Dunsmuir & Sons, they only work when there is a demand and means of taking away the coal.

"Ventilation is good. This part is partly ventilated by the Wellington mine and partly by an air shaft with a furnace. At either of the above mines I always saw plenty of timber and other things necessary for general use about the mines.

"No. 3 PIT, WELLINGTON COLLIERY.

"This is the only shaft worked in the valley of the Millstone by Messrs. Robert Dunsmuir & Sons, with the exception of the air shaft. This mine is worked by a slope, with the top of it near the bottom of the shaft, with the levels from either side. Here the coal is worked on the pillar and stall system, and as the workings are under the valley they leave large pillars to support the roof. In this mine there is a long stretch of coal in sight, and as good as any coal that has ever been opened out in the Wellington Colliery, from 7 to 11 feet thick, all hard and good.

"Ventilation is very good; when I was down in December there were 43,875 cubic feet per minute in circulation for the use of 70 men. This mine is also ventilated on the separate split system, and as the workings are from both sides of the slope the main divisions of the air are also from the slope to either side; on the one side going in the level and returning by the way of the faces or stalls, and on the other, going around the faces of stalls and coming out in the level, thence to the upcast shaft; the motive power here is a fan on the top of the upcast shaft. This being the first fan that was erected in this Province on a large scale for ventilating of our mines, which has done such good service and gives such good satisfaction, so that in this colliery there are three of them working There is now little or no gas seen in this pit. Everything is kept in good order, with plenty of everything that may be required for the successful working of a mine.

"No. 4 PIT, WELLINGTON COLLIERY.

"This is the pit overlooking the valley of the Millstone. Mining in this pit is carried on very extensively; but here, as in all the other mines, there has been considerable idle time during the past year, and that owing to the depression in the coal trade. The coal is worked from this pit by what is known as the North and South side workings. The coal in this mine is very good, although they meet with a small fault occasionally, but not enough to hinder them much. Here in this pit they have a large area of good coal in sight, which will last for years to come. This mine is now connected with the shaft previously mentioned as the No. 6 Pit, and which is now the No. 4 Air-shaft, and on this shaft there is a large ventilating fan. Ventilation is good, and is conducted on the separate split system, the main division being at the bottom of the shaft to each side, and other divisions further in the workings. When I tested the air, one of the last times I was in the mine, I found there was 75,500 cubic feet per minute for the use of 112 men. This was when all the divisions had again united in one, and going towards the upcast shaft. This mine continues to give off gas at times in different places; but it is seldom the fireman finds any, as it is carried away as given off In connection with this mine, and on the top of the upcast shaft, there is a large ventilating fan, 30x10 feet wide, worked by a large steam engine; and here there is also a large steam jet in readiness at any time to turn on steam, in case of any accident to either fan or engine. At this mine I have never found less than 400 cubic feet per minute for each man or boy.

"No. 5 PIT, WELLINGTON COLLIERY.

"In this pit there has also been considerable idle time, for the same reason as that which caused the dullness in the other mines. At one time this mine did not look as well for getting out coal as may have been wished, but for some time back it has taken a change for the better. At present it looks well, and if the coal trade and prices would justify them to do so, they have places here standing idle, where they could employ 50 more miners than they are working at present. This mine is worked on the pillar and stall system, as are all the mines belonging to Messrs. R. Dunsmuir & Sons. The coal is of the usual good quality of the Wellington seam.

"Ventilation is very good. You will observe in my previous report that they were sinking a shaft about 80 yards south of this, the No. 5 Pit. This shaft was got down early in the year, and connected with the workings here; and now that shaft is the upcast and return for the No. 5 Pit. Motive power here is a steam engine with a fan on the top of the upcast shaft, and the last time I was down there was 54,250 cubic feet of air per minute, for the use of 70 men and 3 mules. This mine is also ventilated on the separate split system, the main divisions at the bottom of the shaft taking the levels on the east and west sides, and returning by way of the faces to the upcast shaft. Here there is also a steam jet standing in readiness to turn on steam to ventilate the mine, if any accident should happen to either engine or fan. Here, as at all the other mines in this colliery, there is always plenty of timber on hand, and every other thing which may be thought necessary to the use and working of a coal mine.

"EAST WELLINGTON COLLIERY,

"The property of R. D. Chandler, Esq., San Francisco. There is only one mine in this colliery, and that is in the valley of the Millstone River, and south-east of the Wellington Colliery. In this mine they have been very much troubled with wants and faults in the coal, and at the best the coal has been thin. The coal worked here is what is known as the Wellington coal. The mine has been worked steadily the most of the past year. Although not taking out much coal, yet what they do get is very hard and of good quality.

"You will have seen in my previous report that in the level going west they were in about 400 yards, and at the face they got a fault which put the coal 34 feet above the level. They went up over the fault, and continuing their level for nearly 300 yards on the upper side of the fault, with the coal varying from 5 to 6½ feet thick, good and hard, and improving as they go in. This is a good prospect, and to all appearances there will yet be a good and profitable mine here. The place where they have got the coal is a long way from the shaft, and it will be very expensive to make a good road up to get the coal down; but Mr. Wm. Chandler, the Manager, told me that if the coal keeps as good as at present, there is a likelihood of their putting down another shaft in the spring. The coal in the lower side of the fault is being worked on the long-wall system, and they are very successful with it, the coal averaging about 2½ feet thick. The refuse, and the rock taken out of the roof to make the roadway, fill the waste works full, so that the roof does not settle much, the roof being a strong hard rock bending down gradually behind them as they work out the coal. As the roof does not break at the face, the workman hardly knows that it is settling.

"Ventilation is good; motive power, a furnace. The last time I was down, the air in circulation was 250 cubic feet per minute for each man employed. Owing to this being long-wall work, there is very little powder used, and in most of the places none at all. Sometimes the breaks in the roof, out a considerable distance from the face, give off a little gas, but at the face they never see any. There are not many men employed here, and as there is only one single shaft, they work what men they have on two shifts, sometimes three shifts, a day. It is to be hoped that the coal will continue to keep good on the upper side of the fault previously mentioned, and also that it may get thicker on the lower side. Such improved prospects would be beneficial to all about the district, and the proprietor in particular. He is deserving of such success, seeing the perseverance and push he has made here in bringing about the present position and prospects of the mine.

"ALEXANDRA COLLIERY,

"Belonging to the Esquimalt and Nanaimo Railway Company. There has not been any work done here during the past year.

"PROSPECTING.

"Thomas D. Jones & Company have put down a hole with the above company's diamond drilling machine, in the land of Mr. Charles York, in Cedar District. This hole was commenced late in the summer, and continued till the depth of 967 feet was reached, making it the deepest bore-hole in this district. This company have been rewarded by finding good and encouraging prospects. Thanks to Mr. Jones for the above information.

"GENERALLY.

All the above works I have frequently inspected during the past year, and I found them generally in good order, with plenty of timber and every other thing necessary on hand that was required, or may have been wanted for the carrying on and working of a mine. In the course of my inspection of the several mines, I sometimes have drawn the attention of the overman, or whoever happened to be with me at the time, to something I thought necessary to be done; and whatever it may have been, it was attended to at once. I nearly always found the brattice as close to the face as it was convenient to have it, and it was no uncommon occurrence to get it broken down when blasting; and very often the miners complain on that account, as they do not like to break it. But in the places that are suspected of giving off gas they keep the brattice boards as close to the face as possible, if it should be broken down; and then for a few feet further they have a canvas or brattice cloth hanging from the roof, not being so much in the way as boards and serves the purpose of brattice equally well.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES OF BRITISH COLUMBIA FOR THE YEAR 1886.

"February 15th—Charles Martin, miner, was bruised by a fall from the roof while working in his stall in the East Wellington Colliery.

"March 9th—Thomas White was injured by a crowbar slipping and striking him while at work in the Wellington Colliery.

"March 11th—John Culligan, miner, was slightly burned about the face and arm by an explosion of powder when charging a shot in No 1 Shaft, Nanaimo Colliery.

"March 31st—William Lukey, miner, was slightly burned about his arms by an explosion of gas while at work in his stall in No. 1 Shaft, Nanaimo Colliery.

"May 23rd—William Baker, miner, while in the act of putting in a prop, got the small bone of his arm broken by a piece of rock falling on it.

"May 31st—A Chinaman working with John Hughes, miner, was injured about the head by a piece of rock striking him while at work in No. 3 Pit, Wellington Colliery.

"June 10th—John Bullock and a Chinaman were slightly burned by an explosion of gas while at work in their stalls in the East Wellington Colliery.

"July 5th—Joseph Watson, miner, had his arm and one side of his face slightly burned by an explosion of gas while at work in his stall in No. 1 Shaft, Nanaimo Colliery.

"July 23rd—Samuel H. Myers, miner, was slightly hurt about the body by falling from a ladder while at work in his stall in the No. 1 Shaft, Nanaimo Colliery.

"July 26th—Joseph Livesley cut his leg with an axe; he was using it in the Adit Level, Wellington Colliery.

"July 31st—Thomas Evans, miner, was slightly burned about the arms by an explosion of gas while at work in his stall in the East Wellington Colliery.

"August 11th—William Merrell, miner, was slightly burned about the head and arms by an explosion of gas in the East Wellington Colliery.

"August 23rd—Charles Jones, miner, was slightly injured by a fall of rock from the roof while at work in his stall in the Adit Level, Wellington Colliery.

"September 7th—William Bone, miner, got one of his arms broken by a fall of coal while at work in his stall in the No. 1 Shaft, Nanaimo Colliery.

"September 20th—Ah Yong, Chinese labourer, had one of his arms dislocated while at work in the No. 1 Shaft, Nanaimo Colliery.

"September 21st—May, a Chinaman, was injured about the body by a fall of rock and coal from the face of a stall in No. 1 Shaft, Nanaimo Colliery.

"October 9th—Charley, a Chinaman, was injured by a fall of coal while at work in the Adit Level, Wellington Colliery.

"October 20th—Tong, a Chinaman, had his arm broken by the caving of a bank where he was working, near the Wellington Colliery.

"October 29th—James Williams, miner, was injured by a fall of rock while at work in his stall in the No. 1 Shaft, Nanaimo Colliery.

"November 8th—William Baker and a Chinaman were slightly burned by the igniting of powder while charging a shot in No. 3 Pit, Wellington Colliery.

"November 22nd—Two Chinamen, No. 288 and 376, were killed by a fall of rock while running cars in the No. 1 Shaft, Nanaimo Colliery.

"December 7th—Two Chinamen were very slightly burned by an explosion of gas while at work in the No. 1 Shaft, Nanaimo Colliery.

"December 16th—John Whitfield, miner, was burned about the face and hands by the explosion of loose powder while at work in No. 1 Shaft, Nanaimo Colliery.

"December 28th—John Abernethy, miner, was killed by a fall of coal while at work in his stall in the No. 1 Shaft, Nanaimo Colliery.

"I am sorry to have to make a list of so many accidents for the year that is closed, both serious and fatal, as some of them were; while others were slight, yet they were of such a nature that they had to be reported.

"Of the accidents in the above list, you will notice that six of them were by falls of rock; six by coal; four by explosions of powder; eight by explosions of gas; one by a car; one by a cave of gravel on the surface; one by a crowbar; one by a cut from an axe, and one by a fall from a ladder.

"On looking over the list of accidents, you will see that three of them were fatal; two by a fall of rock, and one by a fall of coal.

"I have enquired into all the accidents which have happened, and a public inquest was held in the two fatal cases from fall of rock, in which all the evidence that it was possible to get was taken; and the depositions and proceedings of the inquest so held are filed in the office of the Honourable the Attorney-General. I beg leave to refer you to the same. Of the fatal cases, the accident which was caused by a fall of coal, did not call for an inquest. I was at the place of the accident shortly after it occurred, and from the result of my inspection and enquiry, I consider it was a pure mischance. The deceased was a miner of great experience, very careful and steady, and I did not think there was anything to be gained from a public enquiry.

"With respect to all the accidents that have happened I have not discovered that any blame or negligence could be attached to any one. In all places where the miner is set to work he is supposed to be skilful enough to know when and where there is danger, and to judge for himself, subject, however, to the overman and fireman, and if they should consider anything dangerous it is their duty to point it out to the workmen, and make, or have the same made, safe. There are, however, besides the practical miner, a great many men employed in the mines who never were in a coal mine until they came to this district, yet some of these men are the most careful of workmen, and will listen and take warning as to their danger from any of their officers; then there are those that are not miners, who will not be advised by any one, although they are ignorant of the dangers they are exposed to any minute; they give the manager and all the officers under him anxious thoughts about them and the other men employed in the mine.

"Now that we have entered on another year I hope we shall enjoy still greater immunity from accidents, and that every one engaged in and about the collieries will use the greatest caution, so that, if possible, no list will be required for accidents, and in making out my report at the end of the year it will be a chapter short, and that the chapter of accidents, as they will have ceased to happen; and I trust that the year before us will be a prosperous year to the mining industry and workmen in common.

"Appended hereto are the annual colliery returns.

"I have &c.,

(Signed) "ARCHIBALD DICK,

"*Government Inspector of Mines.*

"*To the Hon.*

"*The Minister of Mines.*"

COLLIERY RETURNS.

NANAIMO COLLIERIES.

Output of coal for 12 months ending December 31st, 1886.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1886.	No. of tons unsold, including coal in stock, Jan. 1st, 1887.
Tons.	Tons. cwt.	Tons cwt.	Tons. cwt.	Tons. cwt.
112,761	33,260 15	79,637 8	1,119 13	882 10

Number of hands employed.			Wages per day.		
Boys and Indians.	Whites.	Chinese.	Whites.	Chinese.	Indians.
16	304	170	$2 to $3.50	$1 to $1.25	$2

Total hands employed.....490 Miners' earnings per day..... ....$3 to $4

Name of Seams or Pits—South Field and No. 1 Shaft.

Value of Plant—$350,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same.—South Field worked by slope; seam, 6 to 10 feet. No. 1 Shaft, worked by shaft; seam, 5 to 12 feet.

Description and length of tramway, plant, &c.—Railway to South Field, 5 miles with sidings; railway to No. 1 Shaft, 1 mile with sidings; rails are of steel, 56 pounds per yard of standard gauge, viz.: 4 feet 8½ inches; 8 hauling and pumping engines; 10 steam pumps; 4 locomotives; 112 coal cars (6 tons), besides lumber and ballast cars; fitting shops for machinery repairs, with turning lathes, boring, drilling, screw-cutting machines, steam hammer, &c., &c.: diamond boring machinery for exploratory work (bores to 2,000 feet); wharves, 770 feet frontage, at which ships of the largest size can load at all stages of the tide.

SAMUEL M. ROBINS,

Superintendent of the Vancouver Coal Mining and Land Company, Limited.

WELLINGTON COLLIERIES.

Output of coal for 12 months ending December 31st, 1886.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1886.	No. of tons unsold including coal in stock Jan. 1st, 1887.
185,846 tons	52,300	144,526	31,691	20,711

Number of hands employed.			Wages per day.		
Boys and Indians.	Whites.	Chinese.	Whites.	Chinese.	Indians.
None.	351	132 Employed by Miners, 135.	$2 to $3.75	$1 to $1.25	
Total hands employed.....618			Miners' earnings per day.....$3 to $4.50		

Name of Seams or Pits—Wellington.

Value of Plant—$250,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—Six to 10 feet thick; 3 shafts working; 1 slope working; 1 adit level working; 4 air shafts; 1 of these with large furnace at bottom; the other three ventilating fans driven by 2 pair of engines and 1 single engine.

Description and length of tramway, plant, &c.—10 miles railway; 4 locomotives; 200 waggons; 9 stationary engines working; 7 steam pumps; 6 wharves for loading vessels at bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31st, 1886.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1886.	No. of tons unsold including coal in stock, Jan. 1st, 1887.
28,029 tons	427	25,042	1,500	4,060

Number of hands.			Wages per day.		
Boys	Whites.	Chinese.	Whites.	Chinese.	Boys.
2	66	93	$2 to $3	$1 to $1.50	
Total hands employed.....161			Miners' earnings per day.....$3 to $5		

Name of Seam or Pit—East Wellington.

Value of Plant—$100,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—1 seam 2½ feet to 6 feet thick; 1 shaft 8x18 feet, 240 feet deep; 1 level 10x7 feet; 3 levels 7x4½ feet; 1 slope 8x5 feet; 1 slant, 7x4½ feet (working).

Description and length of tramway, plant, &c.—Railroad, 3-foot narrow gauge, 3½ miles; 2 locomotives; 20 4½ ton coal cars; 1 pair hoisting engines; 1 large donkey engine; 1 steam pile driver; 1 steam saw-mill complete, capacity, 12,000 feet per day.

EAST WELLINGTON COAL CO.

TOTAL OF THE ABOVE RETURNS.

Output.	Home Consumption.	Export.	On hand 1st January, 1886.	On hand 1st January, 1887.
326,636 tons.	85,987 tons.	249,205 tons.	34,210 tons.	25,653 tons.

Hands employed, 1,269.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer, at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1887,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1887,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

IA.

Worked.			Description of Machinery.		Value of Gold per ounce.	Estimated value of yield for the year.	Total Divisions.	Total Districts.
Hydraulic.	Shaft.	Tunnel.	Water Wheels.	Steam Engines				
11	3	2	.....	.....	$16 00	$22,900		
3	.....	1	.....	.....	17 25	9,000		
1	.....	.....	.....	.....	16 60	1,500		
.....	1	.....	1	.....	17 00	4,425		

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1887.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
1885	594,782	,, 118,956	713,738	2,902	246
1886	753,043	,, 150,608	903,651	3,147	287
1887	578,924	,, 115,785	693,709	2,342*	296
			50,983,226		

* This is exclusive of over 650 white men who, during the season of 1887, were working on or prospecting for mineral claims.

REPORT

OF THE

MINISTER OF MINES,

1887.

To His Honour HUGH NELSON,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1887, is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,

31st January, 1888.

REPORT.

GOLD.

The value of the Gold exported by the banks at Victoria during the year 1887, is as follows:—

Bank of British Columbia	$320,794
Bank of British North America	58,774
Garesche, Green & Co.	199,356
	$578,924

This shows a large decrease from the bank exports during 1886, and it is undoubtedly the case that the old placer mines, worked now for so many years, are commencing to fail. Fewer men, however, sought employment in diggings of this nature, and the average yearly earnings has not fallen off.

The discovery of ledges of ore carrying the precious metals in varying richness is reported from all parts of the Province, and it is confidently expected that substantial progress will be made during the coming season in the development and successful working of our quartz mines.

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, November 26th, 1887.

"SIR,—I have the honour to submit, for the information of His Honour the Lieutenant-Governor in Council, my thirteenth annual report upon the mining industries of the Cariboo District, accompanied by the usual statistics.

"You will no doubt regret to observe that the statistics show a slight decline in the gold product of the district. There are, however, two principal causes to which this result may safely be attributed, viz., the extraordinary dry season, which compelled most of the hydraulic claims to shut down after but a few weeks' work, and the limited number of men employed on productive works.

"Upwards of one hundred men have been employed during the season in the development of our quartz veins, either working for companies erecting machinery, &c., or on their own account.

"Some forty white miners spent most of the season on a prospecting tour to Goat River and the waters of the Upper Fraser, while a larger number than usual was employed upon public works,—notably the new waggon road between Stanley and Barkerville; and as there was no material increase in population, it will be readily seen that the number of miners working in the alluvial claims must of necessity have been less than in previous years.

"The prospectors to Goat River and the tributaries of the Upper Fraser, although not successful in striking anything to create an excitement, obtained on some of the streams such prospects as would appear to warrant the assumption that this part of the district will shortly prove a valuable acquisition to the gold-fields of the Province.

"The party, owing to the lateness of the spring and consequent delay in getting the new trail through, did not arrive on Goat River till the latter part of July, at which place, the

result not proving satisfactory, most of the party pushed on to the Fraser, and, after building boats, ascended the river as far as Tête Jaune Cache, prospecting on the bars and benches and small tributaries. Returning to Goat River, some of the party returned to Barkerville, while others descended the Fraser to Smoky River, a tributary from the north, some distance below Goat River. Ascending this stream, very encouraging prospects were obtained on the bars and benches.

"It is said that from $3 to $4 per day with rockers could be obtained; and although attempts were made to bottom, bed-rock was not reached in any instance, either on this or the other streams visited, owing to the want of proper appliances to contend against the water. Some 15 ounces was taken from a bar on Goat River by one party; but there, too, it was found impossible, from the same cause, to find bed-rock in the channel; so that, on the whole, we may conclude that the season's explorations were of the most cursory nature. However, a tolerably good trail has been made through to the Fraser, some 75 miles below Tête Jaune Cache, of which, no doubt, exploratory parties will avail themselves to further prove the value of this hitherto unexplored region.

"Few claims in the Barkerville Polling Division have paid even fair wages. Among the most fortunate may be mentioned the Forest Rose and Bradley-Nicholson Companies, on Williams Creek; the Narrow Escape Company, on McArthur's Gulch; the Ontario Company, on Conklin Gulch, and one or two other claims on Mosquito Creek.

"On Antler and Cunningham Creeks the gold product of the season is almost entirely in the hands of the Chinese; consequently, it is very difficult to get correct returns.

"The Nason Company, Antler Creek, have persevered during the season with the prosecution of their extensive works, having erected their mill, sawed lumber, and flumed the creek for some 1,000 feet, the flume being of sufficient capacity to carry the whole creek. They are now ready, once more, to pump out their diggings and start work underground again.

"In the Lightning Creek Division there is a marked decrease in the gold yield the present season. A few of the old claims continue to be worked, but with indifferent success. Harry Jones & Co., having obtained a lease on Peters Creek, are actively engaged in pushing forward their works, preparatory to sinking. They purpose to continue work during the winter months.

"In the Quesnellemouth Division, the bars and benches along the Fraser and Quesnelle Rivers would appear to have yielded about the same as last season, those being worked exclusively by Chinese. While the Keithley Division has yielded a trifle in excess of last year's product, as the Chinese here are enabled during a dry season to work the river bars, which in an ordinary season are covered with water.

"On Horse-Fly River Mr. T. Harper has a large force at work opening up his mine, where work will be prosecuted during the winter.

"The gold product of the district (exclusive of Omineca) for the year 1887, I estimate as follows, viz.:—

"Barkerville Division—1st January to 15th November	$ 79,373
"Lightning Creek Division " "	30,700
"Quesnellemouth Division " "	51,000
"Keithley Creek Division " "	66,600
"Desultury mining of which no acccount can be obtained	10,000
"Yield of whole district from 15th November to 31st December	10,000
	$247,673

"The re-opening of the Barkerville Assay Office, under the charge of Mr. E. A. Martin, has given much satisfaction, as he appears to thoroughly understand his business, and being a man who has had much experience in the treatment of refractory ores, by the latest known methods, will be a valuable acquisition in the development of our

"*Quartz Mining Interests.*

Upon which subject it would, perhaps, be presumptuous in me to say much, when so many reports by professional experts have, from time to time, been published. I will, therefore, confine myself to a statement of facts as to the progress made in development during the season, only venturing the opinion that my next annual report will contain in the 'tabulated statement' an account of bullion produced.

"The B. C. Milling and Mining Co. have, during the season, employed a large force under Mr. Craib as superintendent, in putting down a permanent shaft to the 100-foot level, from which depth a drive has been run along the vein a distance of 100 feet and the vein cross-cut, which is some 26 feet in width and shows some very rich rock, although much the greater portion is considered worthless to work, under any process known at present.

"It is to be regretted that this company did not continue sinking their main shaft, as the indications are that higher grade ore would soon have been reached. This company has also sunk a shaft and run a tunnel in the American location adjoining, in which the vein has not yet been reached.

"The Island Mountain Company has employed from 40 to 60 men during the season, in removing their 10-stamp mill from its former site at the old Kurtz and Lane works to Jack of Clubs Lake; putting up buildings, erecting machinery, burning brick for furnace, and taking out ore, and would, I understand, but for the non-arrival of a portion of their machinery from San Francisco, have been crushing ore this winter. As it is, work on the mill has been suspended. Some half-dozen men are, however, working in the mine taking out ore, which it is intended shall continue during the winter, and be hauled to the mill for crushing as soon as the mill is ready in the spring. I understand some excellent ore is being now brought out of this mine.

"The Quesnelle Quartz Mining Co., of Hixon Creek, has employed a number of men during the season, but with what result I have been unable to learn. Work has been suspended for the season.

"The Burns Mountain Co. has done but little during this season to further prove their mine.

"About 100 quartz claims in all have been recorded during the year 1887. Many are new locations, some of which show most promising indications.

"On Lowhee Creek, Messrs Pinkerton and the Flynn Brothers are at present putting up an arastra, to more thoroughly test their ore. They inform me that they will be prepared to crush early in the new year, and will work any ore brought them (that is to say, a few tons) for one-half of the bullion produced.

"The Black Jack Claim, just above Barkerville, has developed a very rich body of ore, and is now taking out rock, from which (upon being pounded in a mortar) a good prospect of free gold is readily obtained. This company (should their present prospects hold good at a greater depth) will put up a small mill and at once commence crushing.

"The Boyce Co., on the Pomeroy lode, south-east of Barkerville, being so well satisfied with the results obtained, have entered into an arrangement with Mr. I. B. Nason to remove the small 4-stamp mill from Richfield on to their mine and start crushing ore at once. The mill is now being removed.

"There are many other promising locations worthy of mention, but enough has been said to show that the people here have a confidence in our quartz veins, and that an earnest effort is being made to prove that this confidence is not misplaced.

"I have, &c.,

(Signed) "JNO. BOWRON,

"*Gold Commissioner.*

"*To the Honourable*

"*The Minister of Mines.*"

Keithley Division.

REPORT OF MR. W. STEPHENSON.

"FORKS QUESNELLE, 5th November, 1887.

"SIR,—I have the honour to forward herewith the estimated yield of gold for the Keithley and Williams Lake Polling Divisions, Cariboo District, for 1887.

"I cannot notice any material difference in the total yield from last year: although in some kinds of mining, such as hydraulic and ground-sluicing claims, the season has been very short, owing to the fact that we have had no rain during the entire summer, and there being no further supply of water than that received from the melting snow. Fortunately for the miners there was a very heavy snowfall last winter which gave a good supply of water for a longer period than usual from that source during the summer.

"As the principal part of the mining in this section is done by Chinese, they generally take advantage of a dry season to work in places that cannot be got at during a wet season, or when there is an abundant supply of water; as soon as they cannot any longer work their claims they scatter off in pairs, or small parties, and get away to places where they will work in a desultory manner for the remainder of the season, until the cold weather drives them into winter quarters, where they lay off until early spring, when they again start out to take advantage of the low stage of water in the rivers.

"On Keithley and Snowshoe Creeks things have been rather better than usual for the white men mining there, as several of the claims have done very well. The Onward Claim, chiefly owned by Messrs Vieth & Borland, is turning out fairly well, and from present prospects promises to be a good claim. This claim is very deep drifting diggings, the shaft being about 135 feet deep. It was a very expensive claim to open, but with the aid of good machinery it is now in splendid working order, with good drainage.

"Messrs. Anderson & Smith also have what promises to be a good hydraulic claim, situated well up towards the head of Snowshoe Creek, which they have got well opened up with a good set of iron pipes, monitor and all late improvements, and although they are away up on the mountain, where the working season is very short, they express themselves well satisfied with the season's work, and good prospects of improvement next summer.

"Several other parties on Keithley and Snowshoe have also done tolerably well for the past season, but the Great Snowshoe Company, better known as the Long Tunnel, which looked so promising a year ago, has not turned out as anticipated, and although at the present time is shut down for awhile, the owners say they are not beat yet, as they intend to still further prospect the ground.

"On Harvey Creek, the Cosmopolitan Company did fairly well last season, and a short time ago another claim, part of the old Last Chance ground, struck a good prospect, and both claims are likely to pay well for the winter; that being the season when these claims can be worked to the best advantage.

"Kangaroo Creek, emptying into the North Fork Quesnelle River, two miles above the Forks of Quesnelle, is being prospected. This creek has never been bottomed from the cañon down to the river, although it has been rich on the surface down to the clay, or rather a hard dry slum. The surface diggings have been from a depth of 4 to 6 feet, and have been very thoroughly worked over by the Chinese. About a year ago Messrs. Polleys & Birrell got up a company to try and get to the bed-rock. At about 30 feet deep the water in the shaft made a wheel and pump necessary, the building of which occupied the greater part of last summer; then they handled the water very easily and went down to a depth of 45 feet when they struck a stratum of quicksand and slum, through which they could not go in the ordinary manner. They therefore had to shut down. They are now preparing to enlarge their shaft from the surface down, so that they can adopt other methods of going through the bad ground. Altogether it is a difficult and expensive operation. Last spring there was a prospect that something new had been found on Horsefly River. During the winter three men—McCallum, Brodie and Chambers—drove a bed-rock tunnel into the hill, on the left-hand side of the river, about five miles below the old diggings; at a distance of about 180 feet they broke through the rock, and obtained quite a prospect. There were a number of claims taken up, and the new companies joined in with the Discovery Company to extend their tunnel, and find the bottom of what they thought would prove a hill channel. After driving ahead some 60 feet, sinking an air shaft and other work, the ground not improving, the outside companies dropped off. I hear McCallum is making small wages drifting out the ground. I believe, from what I saw of it when there during the summer, that the ground would undoubtedly make good hydraulic diggings if there could be a good supply of water obtained at a reasonable outlay, but I am afraid that is not possible. Mr. Harper has put on quite a force of men on his claim at Horsefly. He has also bought out the company of Chinamen that were located alongside of him, thereby getting their ditch water-right and all their plant, which he thinks will enable him to take out gold this fall. He has also opened a store in there, which will be a great help to parties working in that vicinity. It is sincerely hoped his enterprise may prove a success. Messrs. Kyse & Hilton did not go back this season to further prospect what they found on the South Fork Lake, they being among the party that went into Horsefly early in the spring, and they were engaged in prospecting there until they thought it too late in the season to make a start.

"Quartz does not seem to attract much attention in this section, probably owing to the limited number of white miners which we have. As I mentioned last year, Messrs. Vieth & Borland made a location on Snowshoe Mountain, and took out some rock which they sent to San Francisco (500 lbs.), and had worked, the return from which proved to be satisfactory, and they tell me they are going to prospect this ledge thoroughly this winter. There has been several other locations made on different ledges on Snowshoe Mountain, but no prospecting done.

"I have, &c.,
(Signed) "W. STEPHENSON,
"*Government Agent.*

"*The Honourable*
"*The Minister of Mines.*"

CASSIAR.

Stickeen Division.

MR. CRIMP'S REPORT.

"LAKETON, CASSIAR,
"15th October, 1887.

"SIR,—I have the honour herewith to transmit the Mining statistics of the Cassiar District for the current year, and for your further information to submit the following report.

"The accompanying statistics will be found to show a decrease from last year, on account of many of the old claims being worked out and no new ones having been discovered.

"On Dease Creek there were two hill claims that did pretty well, the balance did not pay wages. There were but few white miners on this creek; most of the gold was taken out by Chinese, of whom there were about 40, working in the bed of the creek with wing-dams on ground that has been worked over several times before. No new discoveries having been made this year on this creek.

"On Thibert Creek there were a few white miners more than on Dease, but fewer Chinese. This creek, with the exception of a few hill claims, is nearly worked out, and some of the miners have left for good, and you will see by the returns that there is quite a falling off in the amount of gold from last year on this creek.

"McDame Creek has held its own; the amount of gold is a little over that of last year. Most of the miners are Chinese. One company, situated on the flats below the cañon, took out $12,000. It is a large company, working eighteen men. The other companies did not do very well. This creek is like the others, very near worked out. The yield of gold for the past season, as you will see by the statistics, has been $55,205, as near as I can ascertain, which, I think, is pretty accurate.

"Very little prospecting has been done this year, for the reason that few miners have the necessary means. There were three miners, Donald McDonald, George Thompson, and O. Barry, spent most of the summer on the south-west branch of the Muddy River. They built a boat at Sylvester's Trading Post and ascended to its head, but did not discover anything that would pay.

"There were two miners worked on a bar 15 miles below the Post on the Muddy, and I hear did fairly well with rockers.

"The prospects for next year do not look encouraging, but I hope that some new discoveries will be made, for there is a considerable portion of this district that has not been prospected. The great drawback is that the seasons are so short and provisions are high; consequently there are not many miners that can afford to prospect.

"There will be about twenty white miners and about seventy Chinese winter in the district. Provisions are plentiful, and at usual prices.

"I have, &c.,
(Signed) "J. L. CRIMP,
"*Gold Commissioner, Cassiar.*

"*The Honourable*
"*The Minister of Mines.*"

Skeena Division.

MR. DEMPSTER'S REPORT.

"ABERDEEN, B. C, 20th October, 1887.

"SIR,—I have the honour to enclose statement of proceeds of this season's mining. I regret to have to report so small a yield, owing, in part, to the unfavourable season; water remaining high till late in July; with heavy rain and high water again on the 1st September, which made the season very short for those working in the bed of the creek.

"The prospects of the hill claims are looking more favourable. Those who are down to bed-rock are making good wages, with the prospect of it continuing for several years.

"Hoping to be able to give you a more favourable report next season,

"I have, &c.,

(Signed) "W. H. DEMPSTER,

"*Collector.*

"*The Honourable*
"*The Minister of Mines.*"

KOOTENAY.

Northern Division.

MR. SPROAT'S REPORT.

"FARWELL, 24th December, 1887.

"SIR,—I have the honour to enclose memorandum on the new mining field near Fort Shepherd which, for various reasons, I treat separately. Reports from other subdivisions will be included in my general report, which will be sent to you soon.

"I have, &c.,

(Signed) "G. M. SPROAT, G. C.

"*The Honourable*
"*The Minister of Mines.*"

"*Memorandum on the silver mining field discovered lately in the Fort Shepherd Subdivision,*
"*Kootenay.*

"In my last year's report I stated that 'the block of country about Fort Shepherd, chiefly 'on the east side of the Columbia, bounded by that river, the Kootenay River, and the U. S. 'boundary—a country in which the well-known 49 Creek and Salmon Creek head—will, I think, 'prove to be a mineral section, but, at present, without a steamer on the Columbia, that corner is 'an appendage of Colville.'

"This anticipation has been realized. There will probably be a good camp there. The records made here during the past season for that section (which, as it is always desirable to use familiar, well-known names, I call the 'Fort Shepherd' subdivision) are of 11 mineral claims (one of which is on Arrow Lake), 3 certificates of expenditure and 4 transfers of interests, but, for reasons presently to be stated, these figures do not show the importance of the mining field.

"As the pressure of other duties prevented me from personally visiting Fort Shepherd, I have collected information by conversation and correspondence respecting the discoveries in that neighbourhood.

"*Topography of the Fort Shepherd Subdivision.*

"The above description, and the accompanying map, will show the boundaries. The locality of the largest group of claims—the Toad Mountain group—is marked by a chequered square (red) on the map. There are other claims on the Pend d'Oreilles and elsewhere.

"The land rises from the valleys of the Columbia and Kootenay by low roughly wooded hills, backed by mountains about 5,000 feet high, which rise still higher to the eastward, over by Big Kootenay Lake.

"The drainage, chiefly, is by 49 Creek and Cottonwood Creek which enter the Kootenay,—by Salmon Creek which flows southerly into the Pend d'Oreilles River, and by Bear Creek which flows into the Columbia River nearly opposite Fort Shepherd. I do not think there is any important drainage into Big Kootenay Lake. The general slope is westward.

"The Kootenay River Valley—a rough trough somewhere about 20 miles long from the outlet of Big Kootenay Lake to the Columbia—forms, as above said, the northern boundary of the Fort Shepherd subdivision.

"Upon the southern wall of that valley, six or seven miles from the river, and situated about the headwaters of 49 Creek—a little east therefrom I think—is a mountain called 'Toad' Mountain, variously estimated as of the height of 4,000 or 5,000 feet; it is at any rate high, for the snow this year was on it till July, and snow showers fell in autumn.

"The largest group of claims, at present discovered in the Fort Shepherd subdivision, is on Toad Mountain.

"*Description of the new Mining Field.*

"Mr. C. H. Montgomery, a well-known storekeeper of Colville, wrote to me as follows on 6th December, 1887:—

"'Those mines were discovered late in autumn of 1886 by Winslow, Hall & Co. Nothing 'was done until spring of 1887, after the discovery had become known. I outfitted two men 'who went to the mines with about ten others, and all made locations, working them during the 'summer. I myself went there in September last, to look at the mines and see what my men 'were doing. I found about thirty men in camp, and more coming every day—the mines the 'best ever discovered on the Pacific Coast,—ledges there running from ten to thirty feet in width, 'and all looking well.

"'Mr. Cobaugh, who went in there with his assay office with Messrs. Hall & Co., made 'assays from the rock of the different ledges as high as 1,600 ounces in silver. The average assay 'of ore at the time I was there ran a little over $300, and without a doubt this will be one of 'the best camps in British Columbia.

"'At the time I left this camp, the last of September, there were about thirty claims 'located, and men working on about eighteen of them. Experts were coming in from all parts of 'the country examining the mines. I am informed there have been about twenty-five more 'locations since I left.

"'Montana and country south, as well as our own, are all excitement now over these mines, 'and there is no doubt but that as early as they can get there in the spring there will be 1,000 'or 1,500 men in that camp. The only drawback there now is an outlet.

"'The only easy way to go to this camp now is by Northern Pacific Railway (Kootenay 'Station), 40 miles land travel to Bonner's Ferry, from which excellent water navigation, down 'Kootenay River and through Big Kootenay Lake to the western outlet, six or seven miles from 'the mines.

"'If we had a waggon road from mouth of the Kootenay River running up the river say 'twenty miles, thence six to the camp, we could have an easy outlet for our ores by Columbia to 'C. P. R. at Revelstoke, thence to Victoria or wherever we wished to go, and goods and people 'could get to the mines easily that way.

"'There is one thing we need in that camp very much, and that is a recorder, as there are 'several parties there who have done work and are unable to record it, the season of the year 'preventing them going either to Revelstoke or Wild Horse Creek, which works a hardship, for, as 'a general thing, prospectors do not have an overplus of money, &c.

(Signed) 'C. H. MONTGOMERY.'

"The opinion expressed by Mr. Montgomery from his own observations in September is confirmed by other letters, and by conversation with miners who have come hither from Fort Shepherd on mining business. Their impression is that the Toad Mountain mines will be more attractive next season than those at Rock Creek.

"I am not able to describe the nature of the silver-bearing rock; some that was coming to me did not reach as the boat was stopped by ice last week; it is said not to be galena. A miner here lately from Toad Mountain said that some thought that the rock would yield more gold than silver when sunk into. To show the size of the ledges—a matter as to which all accounts agree—he said that one was stripped over fifty feet without finding the walls, and the rock averaged over $300 to the ton; and another ledge was stripped for twenty feet without finding walls. These might be masses instead of veins, but he said the general belief was that they were veins.

"*Question of Access and Supply.*

"Assuming that this new mining field is valuable as stated, this question is most important, and demands immediate attention.

"During the past season Colville has had the trade of Toad Mountain as well as much of Rock Creek Mines. But Colville itself is nearly 100 miles from the Northern Pacific Railway, and goods suppliable thence—except flour of local manufacture—have their price increased by nearly 100 miles waggon freight from N. P. R. to Colville.

"Goods and passengers for Toad Mountain have this year been brought by boats to the mouth of Bear Creek, opposite Fort Shepherd, say two and a half miles north of boundary line; and about fifty pack ponies have been employed between that point and Toad Mountain.

"Except, however, in the articles of flour, vegetables, and perhaps cattle, Colville cannot compete permanently for this trade until the Northern Pacific make a railway thither. The Canadian Custom House might not permit boats to cross the line at the boundary.

"This place is the natural place of supply both for Toad Mountain and Rock Creek (except cattle in the latter case) owing to the great advantage of the Columbia River, and the produce of the mines at Toad Mountain must come this way too.

"The competition, however,—and the question involved is whether the States or Canada will supply these mines—will be somewhat close as between this place and some town on the North Pacific Railway that can send goods to Bonner's Ferry. The road from Kootenay Station on the North Pacific Railway is, I believe, a species of waggon road and a toll road. When there (40 miles from North Pacific Railway) a boat will take them, as above stated by Mr. Montgomery, to the 'outlet' of Big Kootenay Lake, which is within six miles of the mines.

"Goods from here, delivered by boat at mouth of Bear Creek, will have to be packed sixty or seventy miles by the miner's trail used this last year.

"Even considering the duty and the more handling on the Bonner's Ferry route, the comparison is so near that much of the trade, inwards, probably will remain in the hands of those who start it.

"But if Toad Mountain could be supplied by trail or road from mouth of Kootenay—say twenty-six or twenty-seven miles—instead of the sixty or seventy miles of the miner's trail from mouth of Bear Creek to Toad Mountain, Canada would command the trade from this place without possibility of competition, and the miners would be more cheaply supplied, besides which the outward traffic—the transport of ore—would be provided for, and would go to Vancouver or Victoria.

"The annexed rough sketch shows the Bear Creek Trail. It is long and circuitous owing to the nature of the surface. You cannot get to Toad Mountain, *it is said* by some, by the valley of the North Fork of Salmon Creek, but the trail, rough though it be, is passable and fairly good until you actually get to Toad Mountain; then it is an abrupt climb. The mountain is accessible both from south and north. Looking northward from the elevated mining camp the Kootenay River, in its course westward to the Columbia, crosses the view.

"I said above that I would explain—what Mr. Montgomery has touched upon, namely,—why the actual records made here do not show the importance of the mining field.

"The recorder got records, with fees, by letters from Colville, but none of the records distinctly described the locality. This I have only lately ascertained, and I do not yet know how far east the place is from the Columbia, as that river bends there, and is not correctly laid down on any map—a remark which applies to the whole western leg of the Columbia.

"When Mr. Vowell and I discussed what would be a suitable division of the whole district of Kootenay, for mining purposes, into two divisions, we considered, as stated by us to the Government, that a line drawn south from about the outlet would, in that part of the district, suffice.

"As Wild Horse Creek is out of the question, owing to distance and expense of travel, and as the whole of the Kootenay Lake section is by topography and water-ways connected with the western leg of the Columbia River, commercially and otherwise, I thought that the administrative division should be in conformity; but as Mr. Vowell wished to have Big Kootenay Lake in his division, we agreed to the above recommendation.

"The Gazette notice, however, states that the eastern line of North Kootenay Division is ten miles from the Columbia, between the railway belt and the boundary.

"Probably the Toad River Mines are more than ten miles from the Columbia; but this we did not know until lately; and they, therefore, may be in Mr. Vowell's district.

"When records, &c., reached this office in the autumn—some being on the Pend d'Oreilles (unquestionably within North Kootenay Division), and others being in a locality not distinguishable by the descriptions—the Recorder, Mr. Kirkup, communicated with Mr. Vowell, and it was arranged, as I understood Mr. Kirkup, that the business would continue to be done here, pending developments.

"The arbitrary ten mile line, in that quarter, is not workable (the Fort Shepherd subdivision naturally is homogeneous), and it would have this effect, that a Pend d'Oreilles miner could come quickly and cheaply to see the Commissioner here, and his neighbour on part of Salmon Creek, or at Toad Mountain, would have to pass through here and have to spend two, or possibly three, days, and $15, to visit the Commissioner at Donald.

"We have done the best we could in this matter so far, under the circumstances above stated; but the matter should be arranged, or, possibly, legal questions might arise as to the holding of claims. A miner was here from Toad Mountain a few days ago, and I have a record from there this morning. The topography is not clearly known, so that arbitrary lines will not do. For instance, a southern line from the 'outlet,' as we now know the surface, might, perhaps, cut a group of mines in two. The whole block should be in one or the other jurisdiction for mining and magisterial purposes.

(Signed) "G. M. SPROAT, *G.C.*"

"NORTH KOOTENAY,
"30th December, 1887.

"SIR,—While waiting for a little information daily expected, in order to close my particular report, I beg to send you, herewith, some 'general remarks' on this district, supplementary to the report made as to Toad Mountain Mines; and I also send a box of mineral specimens, which will give you some idea of the prevalent silver ores at Illecillewaet.

"I have, &c.

"*The Honourable*
"*The Minister of Mines.*

(Signed) "G. M. SPROAT,
"*Gold Commissioner.*"

"*General Remarks.*

"About 500 miners, of whom only 20 were Chinese, have been employed in this district during the past season.

"Skilled prospecting and under-ground miners have been scarce. The Perry Creek Company, in South Kootenay, sent here for miners. A company at Big Bend had to send to the coast for men. This scarcity checks development, as amateur prospecting is not satisfactory and is seldom successful.

"Still, a considerable amount of prospecting has been done during the past season, and the result tends to confirm my impression of the great value of the country along the western 'leg' of the Columbia River, for products of gold and silver, and also, I may add, of timber. The climate is very good; there are hay and arable areas interspersed among the mining grounds, and the Columbia offers the longest stretch of river navigation, I think, in the whole of Canada. These facts make the district valuable, though the actual development of its resources is not yet important.

"For this there are obvious reasons. Quartz mining is proverbially slow in its first stages. This is particularly the case when the ore is of low grade, as such ore can be handled profitably only by rich companies. Such companies invest cautiously in new districts. Again, our placer mining is considerably hampered by the character of most of the streams and by the duration and uncertain volume of the summer floods in them.

"But there cannot be any doubt that both these branches of mining industry, in this district, will grow to be very important.

"It is erroneous to suppose—as some, perhaps, do—that McCulloch and French Creeks are the only placer-yielding creeks in the northern part of this district.

"The colours of gold, and in some instances, pay gold, are to be found in more than a dozen other creeks in that section. There are nine large creeks on the west side of the Columbia, and three on the east side, between Gold Creek and Boat Encampment, a distance of fifty miles. Pay gold has been lately got on two of these without good appliances. On Canoe River, Frenchman's Creek was worked in the old days during a short season.

"The scarcity of skilled prospectors, the difficulty of access, the high cost of transport (10 cents a pound hence to Gold Creek by the Government trail), keep all that country back.

"What is greatly wanted is a steamboat on the Columbia River, and some improvements in its channel. The $10,000 voted for the latter purpose by the Dominion Parliament have not been spent, and it is considered that the railway bridge here would block navigation by the class of boats required on the river.

"Again, south of Gold Creek, between it and Carnes Creek, also, are many likely placer streams that have not been prospected. Farther south, the streams in the neighbourhood of Farwell, do not promise to be auriferous, but Fish River, Upper Arrow Lake, the Slocan on the Kootenay River near the Columbia, and also Pend d'Oreilles River, are known to be auriferous.

"The above, additionally to Carnes, French, and McCulloch Creeks, are a fair showing of placer creeks, many of which, I anticipate, will be worked to advantage.

"As regards quartz, it is now proved that a metalliferous formation, composed, mainly, of black or dark pyritous slates, yielding gold and silver, chiefly silver, so far as known, runs on the west slope of the Selkirks (and of course on the east side of the Columbia River) longitudinally, and, as far as can be judged, continuously, in a strip of varying breadth, north and south, throughout the district, and probably, for a long distance north and south, beyond.

"This formation appears, for example, in the Fort Shepherd subdivision—on Big Kootenay Lake,—also in the section immediately east of Lower Arrow Lake (which I call the 'Slocan' subdivision), again, upon the shore of Upper Arrow Lake, and, as you already know, at Illecillewaet, Carnes Creek and Big Bend.

"Notwithstanding the rough, deeply covered surface of the country, the continuity of the formation is traceable, or fairly inferable, throughout the above distance—the general trend being a little west of north. Innumerable quartz veins, ramifying and crossing in all directions, are found in it.

"They are to be seen on the stony scarps of lofty mountains; they pierce and sometimes climb up and over ridges; they burrow under hills, crop out on benches, traverse valleys and variegate lake margins and the beds of streams. A large part of the formation is hidden, and always will be hid, under vast mountains, but the numerous valleys enable it to be attacked in many parts of its length.

"Judging by the little that 200 men have been able to do in examining a circumscribed, small bit of this elongated mineral strip, during the past season, on the South Fork of the Illecillewaet River, I should say there will be plenty of prospecting work to be done in this district, a hundred years hence, even with a mining population numbered by thousands, instead of hundreds.

"The smallness of developing work done, so far, forbids generalizing, but my impression is that the northern part, and perhaps the extreme southern part, of the district will yield more gold than silver, which latter may be found chiefly in the central part. What other valuable metals exist is not known. The presence of cinnabar is vaguely reported. Silver ores, so far, are the commonest. These consist, generally of galena and gray copper, as the main constituents. In some veins the above two ores are mixed; in others, one or other predominates, and the galena occasionally occurs in considerable purity. The cupreous ores, as a rule, have the highest silver contents. The veins often lie close together, and, as above said, they frequently cross. In such a broken country, the course of a particular vein is not easily detected. And with so much cover on the surface, examination is difficult on the lower parts of the mountains. But anybody on the mountain side may get a good general idea of the greater work of nature in the surrounding area, by observing, as he constantly may do, the ramifying and crossing, the swelling and dwindling of veins, and some of the hidden causes of mining misadventure, depicted as a picture lesson in miniature quartz tracery, on the smooth face of a yard square of split slate that may be lying near his feet.

"The question whether there are many so-called true 'fissure' veins or lodes in given parts of the great metalliferous strip, probably is not important. The metal is where you find it, and adventurers in mining have to satisfy themselves as to its nature and presence before investing their money. The upholders of one theory as to the cause, or causes, of the presence of metal in the veins, say that fissure veins are more likely to be metalliferous. The upholders of another theory say that you are just as likely to find metal in ores that are not contained in 'fissure' veins.

"I said above that low grade ores, as a rule, required large capital to handle them. We have plenty of these ores, chiefly galena, in the district, but it is also very probable (though, indeed, only croppings have been tested) that we also have veins—generally yielding gray copper and smaller in size than those yielding galena,—which are distinguished by having a small quantity of rich ore, commonly silver-bearing, it would appear. There thus may be room for individuals, or small companies, whose concern with the ores from the mine will be simply their extraction and sale to the highest bidder on the spot. Such sales would be made through the managers of sampling works, and the cash received would enable the mining to be continued. But this industry cannot exist without sampling mills and smelters, which are to the miner very much what grist mills are to the farmer.

"I have the pleasure to send to you a box of mineral specimens from various veins at Illecillewaet, for which I have to thank Mr. Kirkwood, a pioneer miner there.

"In conclusion I have to add that the respect for the law shown by the mining population generally in this district, has been remarkable. Most of the mining disputes—some of which looked serious— have in the end been left practically to the friendly arbitration of the Gold Commissioner, without the institution, or at least without the prosecution, of regular suits.

"The suits in the Mining Court have been connected chiefly with miners' wages, or supplies to miners."

Illecillewaet Subdivision.

"NORTH KOOTENAY, 2nd January, 1888.

"No placer diggings have been found in this Subdivision, but it is thought that the North Fork of the Illecillewaet, Fish River (which enters the head of Upper Arrow Lake), and some other streams may prove to be placer streams.

"The great feature at Illecillewaet is quartz mining, which, accordingly, I have studied with some closeness. I frequently visited the camp, and on one occasion ascended the dividing ridge in the company of Professor Selwyn, C. M. G., and examined the veins at the highest elevation.

"The records of mineral claims number 205; certificates of expenditure 59, transfers 77, during the past season.

"The largest owner of claims there is the Selkirk Mining and Smelting Company, Limited. They are interested in more than a score of claims. Messrs. Corbin, Kennedy & Wood have about half that number. A dozen other claims are distributed in the hands of holders, many of whom probably could find more or less capital to work them, or to open them, for a satisfactory test. A few are held by men who have been able to expend the necessary $100, and hold the claims for what may turn up. The remainder, say 146 claims out of the 205 recorded, would appear to be vacant.

"The largest and almost the only large transaction in mineral claims at Illecillewaet has been the sale of $\frac{2}{3}$ of one claim for $16,000. The other 76 transfers have been for amounts ranging from $3,000 and $1,000 down to the small or nominal sums which constitute the consideration in most of the cases.

"The shipments of ore, other than small lots for assay, have been made solely by the above-named Company, and consist of about 250 tons of selected ores, betweeen the 25th of July and 7th of November, which represent a gross value of $21,000, and a net value at the smelter of about $15,000, say nearly $63 per ton as the average net yield at smelter. The range of the percentage of lead was from 17 to 52, and of the silver assay from 36 to 149 ounces per ton.

"The ore got out, and now at the mines and on the dump, by the above-named two mining companies, may be roughly estimated as worth $15,000.

"The Selkirk Company has spent $5,000 on 8 miles of trails to its different claims, and Messrs. Corbin have spent a large sum on similar work.

"The crushing and sampling mill, capable of sampling 100 tons of ore per day, and with a very complete assay office attached, has been erected by the former company at a cost of about $8,000, and this company, further, has made considerable expenditure on ore sheds, workmen's houses, &c.

"I understand it is probable that Messrs. Corbin, who have spent the summer in tunnelling and testing some of their best-looking claims, with satisfactory results, may erect sampling works next summer, if means of access to their valuable claims on the North Fork is provided.

"Mineral claims have been recorded which are situated both north and south of the C. P. R. line all along from Illecillewaet to Glacier Station, but most of the claims are on the north side of the line, about two miles east from Illecillewaet Station. They extend almost from the track up to the summit—4,000 feet high—of the divide between the South and North Forks of the Illecillewaet, and some of the veins run through or over the summit, and re-appear or continue on the North Fork slope, and in the bed of the North Fork stream.

"The latter valley cannot be thoroughly prospected, or its mines utilized, until means of access are provided up it from Albert Cañon. The divide is steep on both sides, and snow lies long on it.

"Owing to the migratory character of the population it is difficult to estimate the number of miners, but I think that an average of about 200 prospectors at Illecillewaet would be approximately correct.

"The visits of a number of experts from the United States and England show that the locality is becoming known outside the Province.

"The energy and enterprise of Mr. G. B. Wright have been mainly instrumental in starting the Illecillewaet camp, and Messrs. Corbin, Kennedy & Wood are the pioneer prospectors of both North and South Forks.

"A small village of about 30 houses has sprung up around the railway station and sampling mill, with the usual small hotels and shops, but there has not been any active competition to secure lots at Illecillewaet. The buildings are partly on the land of the railway company, and partly on Dominion land.

"The slackness of competition for ground is not owing to any doubt of the goodness of the mines, but perhaps from some notion that Albert Cañon, at the junction of the two streams, may be a better place for a village than Illecillewaet.

"The formation, locally at Illecillewaet, so far as examined, presents commonly a heavy limestone caprock, and foot-wall of slates—black or dark pyritous slates.

"Iron sulphurets, highly coloured on the surface, form part of the veins and hanging walls.

"The ore itself consists usually of galena, carbonates of lead and gray copper.

"The gangue of the veins is generally a reddish quartz, which lies in regular veins varying from 4 to 12 feet in thickness, and is sometimes closely mixed with streaks of pure limestone. The carbonates run through this quartz in streaks from a size of a few inches up to two feet, and generally carry from 20 to 40 ounces of silver to the ton, and from 10 to 25 per cent. of lead. Some streaks, however, are found which assay from 100 to 300 ounces to the ton.

"Mixed with these carbonates is the pure galena ore in pieces varying from an ounce up to a ton in weight, and lying in veins from 3 to 18 inches in thickness. This ore, when free from gangue, gives from 65 to 70 ounces of silver per ton, and 55 to 60 per cent. of lead.

"The gray copper ore lies in solid veins, from 4 to 18 inches in thickness—sometimes mixed with galena—and assays from 200 to 800 ounces silver per ton, and from 6 to 30 per cent. of copper. Some of the decayed copper ore of a greenish hue has run as high as 1,800 to 1,900 ounces, and one specimen gave 2,825 ounces to the ton.

"If one might generalise from very limited data, the claims on the southern side of the mountain divide appear to be richer in lead and carbonates, while those on the northern side show more gray copper. Ore from several of the latter, packed over the ridge on the backs of men, with copper, galena and gangue mixed, gave returns of about 250 ounces to the ton.

"The specimens sent to your address, in a small box, will show the different kinds of ores above-mentioned.

"The Isabella, Carnmony, Shamrock, Lanark, Maple Leaf, &c., are on the south side of the divide—the Lanark being the mine now most worked. The Shark, Whale, and other claims called by the names of fishes, are on the north slope of the divide.

"The claims being on the slopes of a lofty divide between the South and North Forks, it is obvious that a railway or road up both valleys is essential. The C. P. R. furnishes the south valley with this. The North Fork valley, where many think the richest claims are, is in a state of nature.

"The next consideration will be to have the best means of getting the ore down the slopes to the railway or road. This has been done on the South Fork by the trails already mentioned. On these pack mules have carried, each, 320 to 400 lbs. of ore from mines at a height of 3,500 feet to the railway, but this must be considered a temporary arrangment. Wire tramways probably must be used. Such a tramway, 1½ mile long, and at an angle of 20 to 30 degrees, would transport from 60 to 100 tons in 24 hours. It would cost about $12,000. No machinery would be required, as the weight of the loaded buckets would run it. Until some such cheap means of transport to the railway is provided, so that all the ore can be shipped as it comes from the mine, a heavy expense is incurred at the mine in assorting the better from the poorer grade.

"A further and vital consideration is the provision of a smelter. In connection with this question it has to be borne in mind that nearly ¾ of the ore found thus far will not average over 30 or 35 ounces of silver to the ton, and consequently will not bear expensive transportation. It is, however, of a class which carries most of its own fluxes.

"There is not, I believe, a single smelter in any part of Canada. The present annual consumption of lead and its products in Canada is of the value of $250,000. The import duty is $12 a ton. A very large demand for lead exists in China.

"I am not able to express any opinion as to the description of smelting works required, or the best locality for them. As to the latter question, much depends upon the transportation rates on the C. P. R. Possibly the cheaper prices of coke, coal, limestone and iron ores on the coast may show an advantage in having the works there, particularly as municipal subsidies may be available, in aid of the cost of plant.

"Looking to the nature of the Illecillewaet ores, as described above, I should suppose that suitable smelting works would not be a small affair. There ought to be refining plant to separate the silver and gold from the lead, furnaces to reduce the copper and roast the sulphurets, &c.

"It is a slow, difficult and great business to make a successful quartz camp, even when a railway runs through it, but when once established, the industry is valuable and, often, permanent. Illecillewaet is in its infancy, but, upon the whole, I think that the camp may succeed and grow. It won't amount to much though if the North Fork section remains undeveloped.

Big Bend.

"Smith's Creek (opposite Goldstream) and Fernie Creek, on west side of Columbia (8 miles north of Smith's), are the two creeks of the group of a dozen large creeks, between Goldstream and Boat Encampment, from which pay gold has been taken this season. All these creeks show fine colours, and are well worth careful prospecting. Several of them were proved to be auriferous 20 years ago.

"*Smith's Creek (placer).*

"During the latter part of the season, about 15 white miners worked on bars and benches. The highest daily yield (only in one case) was $11.20 to one man; another $10, and the range was from these sums down to $2. The season before last, a miner got $100 in five days with a rocker. The old diggings, about a mile north from the present mouth (possibly an old mouth of the creek), yielded $3 to $5 a day per man, and now yield $2 to $3. There is probably plenty of gold at Smith's Creek, when the right way to work it is found. There may be room for many hundred Chinamen. The men this season had no appliances. They went to try it on being flooded out at Carnes Creek. The stream bed is boulder-strewn, like most streams here, and is plagued also with high water. If the few prospectors in the country are not drawn to Toad Mountain, &c., Smith's Creek will be tried again in spring. The creek is 25 miles long, from head of south or main branch. There is the usual expansion of the bed at the mouth; the stream narrows for about five miles up. You next come to five miles of flats, at the head of which is the three mile cañon just below the forks, one from south, the other S.S.W. Gold has not been found on the latter.

"*Fernie Creek (placer).*

"Four men in the old days made high pay, $8 a day per man, for a whole season; one of whom tells me he thinks the same can be done again. Two prospectors went there this fall, and sank a shaft of 12 feet and got pieces of gold worth $2½ each, in the gravel. Having a small

stock of provisions they had to leave. The stream is wide—250 feet at mouth—cañon begins half a mile up, and continued four or five miles; whether flats occur above is not known. The creek is as large as Carnes Creek; could be worked cheaply—water easy for wheels—a fall at mouth of cañon.

"These numerous, large northern placer streams, possibly rich, remain untested and undeveloped, owing to the scarcity of prospectors, and the want of a steamboat on the Columbia.

"The glittering prizes of quartz mining attract prospectors, but the blanks are greater than in placer mining. There must have been 100 men at Illecillewaet for instance, this summer, who, after spending their money in outfit and keep, and doing the hardest kind of work, had nothing at the end of the season but a bare record which they could not fortify by the required $100 expenditure. They expected, vaguely, that somebody would buy their interest. A placer miner is more likely to have something in pocket for winter.

"Frenchman's Creek, the second creek up Canoe River on the east, gave good pay formerly.

"*McCulloch Creek (placer).*

"The Ophir Bed-Rock Flume Co., on their one and a half miles of leased ground at mouth of this creek, have not washed up yet, owing to the quantity of water that runs out of the face. They will remedy this by a new flume, and wash up in spring, until then, work is suspended. The most expensive part of the work is done, and the prospects are considered good. The derrick, worked by a hydraulic giant, hoists rock and timber well. Several thousand tons of rock have been moved. Bed-rock has been reached—sloping rim and bed-rock on falls at mouth of creek—and the work advances to more favourable bed-rock. The company, this season, have put in about 170 feet of flume, the end of which is on bed-rock. About $1,500 worth of coarse gold has been picked up, lying at the mouth of the flume, where new boxes were put in.

"The summer was practically lost to this company by a sudden flood, which covered with a jam of stumps and boulders the whole works and destroyed 70 feet of flume. By this flood, an American gentleman visiting the mine, Mr. G. P. Maule, lost his life. His property was sent to his administratrix through Messrs. Drake, Jackson & Helmcken.

"One twelfth interest in the above company was sold in September last for $3,000.

"*Bald Head Company.*

"This company, after spending $11,000 on a tunnel which they have driven for 1,300 feet, without finding bed-rock—the tunnel, as is now generally admitted, being on too high a level—have decided on applying for a lease to facilitate the obtaining of fresh capital. The Blue Bell Company, immediately above them, join in this. The applicants, being *bonâ fide* working miners, whose enterprise and tenacity deserve success, and there being no objections to their application by any miner on the creek, I propose to recommend it to the favourable consideration of the Government, and I thus hope work will be resumed on these claims in spring.

"*The Selkirk Company.*

"This company have run their tunnel in for 500 feet without finding bed-rock, and inform me that they propose resuming work in the spring.

"*Ericson Company.*

"Mr. Glover's Company have temporarily abandoned work on this claim and removed to Gold Hill, French Creek, where they are taking out good pay.

"*French Creek (placer).*

"The prospects of this creek are good. The Glover Company on Gold Hill, on the west bank, near mouth of creek, are making $10 to $15 a day to the man. They did not get to work until late in the season, but will work all winter. They have a tunnel in about 90 feet, log-house, dump-house, and new shoot. Having no water on Gold Hill, they dump the stuff down to French Creek. Water could be got at a roughly estimated cost of $2,000, and, looking to the large area of ground, believed to be as good as that now being worked, this improvement, doubtless, will be effected. I think there is plenty of ground for hydraulic mining on French Creek. Mr. Glover's well merited success will give confidence to others.

"The French Creek Tunnel Company have practically lost the season, owing to disputes among the members, which caused several suits in the Mining Court. This caused a stoppage of work, and, again, after work had been resumed. Happily these disputes have terminated.

Everything is in good shape for work—tools on the ground, excellent houses, and provisions for the winter. The foreman was here lately for men, and took half a dozen back with him. There having been so many interruptions owing to the above causes, he could not estimate the yield, but said they were on pay, and hoped to do well throughout the winter. This company, which is chiefly composed of eastern men with considerable means, have informally mentioned that a lease would enable them to invest more largely, but the difficulty is that the ground immediately above them is held by a working company; otherwise, in the absence of objections, I would recommend the grant.

"*French Creek (placer).*

"The May Mining Company, the company last above named, have sunk a shaft of fifty feet, and have indications of approaching bed-rock. The gravel is good wash gravel, and contains fine gold. The shaft is 2,600 feet up stream from that of the French Creek Tunnel Co.'s shaft, where bed-rock was struck at 35 feet. The Company have good log-house, wheel-house, and an excellent 5-inch iron pump. The men worked until middle of December, when they could not keep the pump going, owing to severe weather. The foreman will return in February to prepare for spring work.

"Two miners have taken up claims below the French Creek Tunnel Co.'s claim, and were about to work by sluicing the old $3 diggings, near mouth of the creek, but the water, following the fall rains, became too high for them. They are wintering on French Creek.

"*Carnes Creek (placer).*

"This creek continues to promise well as a placer creek, and on its north side, about two and a half miles up, a quartz ledge which may turn out good, has been discovered. Assays of croppings gave from 26 to 43 ounces of silver per ton, and were heavy in lead. The extraordinary and prolonged floods have sadly interfered with the miners, of whom from 30 to 20 whites have been at work and 20 Chinamen. The Cameron Co. only finished their dam a short time before the frost came. They got from $1 to $3 on ground which I think had been worked before. The White Elephant Co. made a flume 425 feet long, 12 feet wide, and 4 feet high, with which to work the cañon. This has never been worked, but is probably very rich, as high pay has been got immediately above and below it. A flood, caused by rains in the fall, damaged the flume, and as soon as it was repaired the frost set in. This enterprising company proposes, now, to attack the cañon in spring before the water rises.

"The Carnes Creek Consolidated Co. (Limited), immediately above the cañon, lost their flume too, and were making a wingdam at the close of the season. Their ground is good. Four men sluicing got $126.85, in one day; another day $70.27 to five men, and another day $72.50 to five men, and so on, getting irregularly smaller amounts per day, with an aggregate, notwithstanding interruptions and mishaps, of about $1,500. In consequence of this, the Balfour Co. have taken up 1,000 feet, immediately above the last named, and propose to work in spring. A mile farther up, the McVitty Co. held very likely ground and had sunk a shaft 32 feet, but could not keep it clear of water, and the principal member of the company having become amenable to a criminal charge and absconded, work was stopped. The Rip Van Winkle Co., above McVitty's, ran an 80 feet tunnel, but getting only $28, stopped work. Some of that company, however, propose to try it again in spring. There are four or five miles of the creek open up to the forks, and on these there is also ground, so that the creek has great possibilities though work is difficult owing to the floods. I have no doubt some of the benches on both sides are suitable for hydraulic mining.

"*Big Bend (Quartz).*

"A few claims have been recorded, but nothing spent on them. Confidence in Big Bend quartz continues, and some think it will yet be the best quartz subdivision of the district, but the difficulty of getting in machinery discourages practical action. From letters received, however, it is not unlikely that several quartz claims there will be examined and, perhaps, opened next season."

Southern Division.

MR. VOWELL'S REPORT.

"DONALD, B. C., December 31st, 1887.

"SIR,—I have the honour to forward herewith my report, together with mining statistics for the year ending 31st December, 1887.

"There has been a marked falling off in the number of companies mining on Wild Horse Creek. The claims worked have done fairly, owing to there having been plenty of water and good dumpage. These companies, four in number, took out about $23,000, which, with the estimated sum of $3,000 derived from desultory mining, carried on by Chinese having no regular employment, makes the total output from Wild Horse Creek $26,000. Mr. David Griffith, who has been on that creek for the last twenty years, put, last summer, a No 2 giant to work upon his claims, but, owing to a late start, has not cleaned up this year, as it entails some heavy work to do so. It is thought that there is considerable gold in his flumes.

"Palmer's Bar has yielded very little. There were some 13 Chinamen upon that creek who did not make wages.

"Moyea River has also fallen off, but $500 having been taken out by the few Chinese working there.

"Bull River, which has given evidence of some very rich deposits, has had no steady work done upon it, owing to continuance of high water. There were seven white men engaged in mining in that locality, and they, in a very short time, took out collectively about $2,250 in coarse gold dust.

"Weaver, Nigger, Dutch, Toby and Cañon Creeks have been abandoned as unprofitable fields for placer mining.

"Upon the whole, the outlook for placer mines, of any extent, is not encouraging.

"*Deep Diggings.*

"The Perry Creek Gold Mining Company have, at considerable expense, succeeded in putting down a shaft some fifty feet in their mining ground. Owing to quicksands having to be contended with while sinking, it was an undertaking requiring great care and skill. Mr. Billsland, an old Cariboo miner of large experience, is the company's foreman, and he has been successful where others in the past have failed. Upon completing the shaft it was found that the bed-rock was pitching, and that the company would have to drift for the channel. In consequence, however, of the amount of water coming into the shaft, the work had to be stayed until the arrival of pumps of sufficient power from Victoria, and it is hoped that they will be placed upon the ground this winter. In the meantime, the company's men have been engaged in erecting substantial buildings for winter quarters, and in getting out timbers, &c., for future operations.

"In the Mount Cennis Tunnel work is being carried on vigorously, day and night shifts being constantly employed. As yet nothing can be determined as to the results. Mr. Billsland speaks very highly of the indications, &c.

"*Findlay Creek Mining Co. (Hydraulic).*

"Messrs. Cochrane & Brady have conveyed their rights, under the mining lease granted to them on Findlay Creek in 1886, to a company formed in London, England, called the Findlay Creek Mining Company, Limited. Cochrane & Brady have constructed a ditch of 1,000 miner's inches capacity, and a saw-mill of sufficient power to turn out about 5,000 feet, board measure, of lumber per day, and have also completed hydraulic works capable of washing 1,000 cubic yards of gravel per day of 24 hours.

"They had got fairly started in opening up their first ground, near the mouth of White Tail Creek, when the heavy frosts of October 23rd and following days obliged them to shut down for the winter

"During the season the company's engineer has thoroughly prospected a considerable portion of their ground, and the results have been so satisfactory that the present works will be increased by another pipe and giant, and another set put in about two and a half miles further down Findlay Creek, early next summer.

"Quartz—auriferous and argentiferous—seems to abound throughout the district; some very rich 'gray copper ore' has also been found; but as no capital has as yet been invested towards the development of any of the ledges discovered, it is unnecessary to particularize them.

"In time, no doubt, *bona fide* experts and capitalists will come in, and then these mines will be developed and worked to advantage.

"The Otter-tail Gold and Silver Mining Co., which had commenced operations for the development of some ledges containing respectively gold, silver, copper, and galena ore, in the Rocky Mountains, were, unfortunately, burnt out last June. Considerable property was destroyed, consisting of stamping mill, saw-mill, store and dwelling-houses, tramways, tools, provisions, &c. The total loss is estimated at $60,000

"Kootenay Lake has again caused considerable excitement by the discovery last fall of some very rich gray copper ore in that locality.

"These mines are situated about twenty-five miles from the lake, viz., 19 miles by water down the outlet, and thence six miles south from the outlet over a heavily timbered ridge or divide 2,700 feet above the river or outlet. The west fork of Cottonwood, Smith's Creek, heads at the mines and flows east, with Salmon River and 49-Mile Creek flowing to the west.

"The mineral belt is, as near as could be estimated, from one and a half to two miles wide, running about 20′ west of north, and extending, so far as has been discovered, about five miles north and south. The ore found is very rich in silver, as will be seen by the assay returns enclosed, which show an average of $105 to the ton for first twelve assays, and $127 for twelve others. I also forward some samples of the ore, duly labelled. It is claimed that some of the rock sent out assayed from 1,000 oz. to 1,160 oz. of silver to the ton.

"Three claims upon the same lead have been taken up by the discoverers, and are known as the property of the Kootenay Bonanza Co. One of these, the Silver King, shows an immense body of ore between the walls (granite and mag. limestone) from 20 to 25 feet wide. The other two promise equally as well.

"There have been some twenty-five mineral claims taken up, and with the exception of two of them, which show galena, they all contain gray copper ore.

"About twenty-five men have built houses and intend wintering at the new mines, should they be able to get in provisions before the winter sets in. These men are mostly from Colville, and seemingly are all Americans of a very intelligent class, and anxious to conform to the laws of the country.

"There is no doubt but that there will be at least 100 men at these mines next spring, and I would recommend that provision be made for an acting recorder and constable at that place during the summer months.

"The trail from the landing on the outlet to the mines, at present, is a very rough one, having been made in a hurry last fall by the miners. The latter are very desirous that a waggon road should be constructed over that route, so as they could get in machinery, &c. I think that a very good trail could be made at a cost of from $1,000 to $1,500. It is a steady climb all the way, and upon present trail a horse can with difficulty pack 150 pounds. There is a trail from the mines to Colville, which was made by the miners when coming in after first excitement.

"Only three men were living at the old camp on the lake, who appeared to be doing nothing except existing upon locations.

"*Coal*,

As discovered in the Crow's Nest Co.'s mines in the Rocky Mountains, Kootenay, is to be found in vast quantities. There are in all fifteen seams in sight, three of which are respectively 14 feet, 25 feet, and 30 feet in width; the remaining twelve are from 3 to 7 feet wide. This is the most extensive showing of coal, I think, on record, being an aggregate width of 130 feet, situated on one hill, the belt being one-quarter of a mile wide. Mr. Dawson, in his report, classifies some of this coal as semini—anthracite.

"The waggon-road, with bridges, completed this year, from a point known as 'Steamboat Landing,' on the Columbia River (about 50 miles above Golden), to the old camp (south), a distance of about 140 miles, is looked upon by all interested in the country as one of the most important works ever undertaken in the district, assisting, as it must, to a degree incalculable, the future development of mineral and other resources in this part of the Province. * * *

"A considerable amount of prospecting is being still carried on for quartz, and fresh finds are continually recorded, but all by poor men who can do nothing towards opening up such mines. In this office some 61 mineral claims have been recorded this year, in addition to those previously taken up.

"I have, &c.,
(Signed) "A. W. VOWELL,
"*G. C. & S. M., &c.*

"*The Honourable*
"*The Minister of Mines.*"

"*Certificate of Assays.*

"ASSAY OFFICE KOOTENAY BONANZA MINING CO.—I. C. COBAUGH, Assayer.

"Assay in silver of Silver King:—Ounces per ton—111, 631, 92, 204, 24, 102, 38, 82, 46, 30, 145, 19.

"Assay in silver of Kootenay Bonanza:—Ounces per ton—150, 29, 408, 68, 68, 97, 38, 29, 213, 25, 38, 43.

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE, CLINTON,
"December 16th, 1887.

"SIR,—I have the honour to enclose herewith mining statistics and my annual mining report for the District of Lillooet for the year ending 30th November, 1887. The total ascertained yield of gold for the year is a little over $100,000, itemized thus:—

"A. W. Smith, Lillooet	$65,696
"F. W. Foster, Clinton	20,432
"E. Bell, "	5,000
"All other reliable sources	8,894
	$100,022

"This is under the amount of last year, but I have no doubt the yield of the district is fully up to that of last year, when I take into consideration that the Chinese are the principal miners, and their claims on Cayoosh Creek the richest in the district. Mr. Smith is again the largest buyer, nearly two-thirds of the whole amount having passed through his hands. The largest proportion of this is from the alluvial claims on Cayoosh Creek, owned and entirely worked by Chinese; the balance from Bridge River and the bars of Fraser River, all within a very small compass in the district.

"Mr. Phair, Mining Recorder at Lillooet, reports to me 'that there were 198 mining claims 'and 26 mineral claims recorded by him during the past year. The mining claims are situated 'on Cayoosh and McGillivary Creeks, Fraser and Bridge Rivers, and the mineral claims are 26 'on Cayoosh Creek, 3 on Anderson Lake, and 1 on Pemberton Portage. The great proportion 'of the alluvial mining claims are recorded by Chinese, and the whole of the mineral claims by 'whites. The Chinese took a great deal of gold out of Cayoosh Creek this year, and many of 'them have left for China. A company of 7 Chinese on the South Fork of Bridge River took 'out $2,000 last spring. There were 14 whites mining on the same stream, and all did fairly 'well except a company of six, who were opening out a hydraulic claim, but they did not reach 'the pay strata until the season was closing. They have good prospects for the coming year.'

"The alluvial mining claims on Cayoosh Creek are all situated along the lower end of the creek, commencing at a point a short distance above its confluence with Seaton Lake Creek, and thence in a S. S. W. direction for about ten miles to a point intersected by free gold-bearing ledges, discovered early last September. Beyond this point the creek for several miles has been prospected by the Chinese, but evidently without satisfactory results. *Above* the line of the quartz ledges they have not done any mining. The alluvial mining on the creek, so far as at present known, may, therefore, be said to be confined to the lower ten miles. Intervening in this ten miles is a

deep cañon of nearly two miles in length, through which the water of the creek moves at a comparatively slow rate, the lower end having been filled in by mountain slides; from the nature of the surroundings of this cañon the Chinese have not been able to get at it, the claims being both above and below it. Accepting the theory as correct, that the gold found in the Chinese claims has been liberated from the quartz ledges above, and this theory seems well borne out by so much gold being found in their claims with quartz attached, I can see no reason why this cañon should not be equally rich in gold. It is a matter for the consideration of capitalists, as the creek would require to be flumed, and it is a wild stream to handle at all seasons. The Chinese must abandon their claims sooner or later, as they can only work down so far as their Chinese pumps, set at an angle of 45°, will keep the ground dry. Not one of them will ever reach bed-rock. I would, therefore, infer that the best paying ground remains untouched. The ground once abandoned, capital might step in and flume the creek at different points and work the whole bed of the stream, which has, without doubt, proved itself already one of the richest spots that has ever been found in the district.

The Fraser River Cable Company.—This company was formed early last spring; they obtained a lease of certain abandoned mining grounds situate between the 11 and 13-Mile Posts, but on the west side of Fraser River where there is no water available for mining purposes. To surmount this difficulty, they stretched a wire cable of 400 feet in length across the river, and to this cable suspended a hose connecting with a ditch on the east end, and by this means convey the waters of the 11-Mile Creek to the west side of the river. Unfortunately, the preliminary works were placed too low; at considerable expense the company have raised the ditch and cable, and are now in a position to commence active work in the early spring. Their outlay up to the present is, I believe, in the neighbourhood of $3,000.

"*Quartz.*—On the mica ledges at Clearwater and the auriferous ledges on Mahood Lake and Deception Creek no work has been done during the past season. On Mad River, a tributary of the North Thompson, a gold and silver-bearing ledge has been discovered by Mr. Allingham, and one claim recorded thereon. Assays of the ore of this ledge at Ottawa gave very good returns in both gold and silver.

"*Foster Gold Mining and Milling Company, located on the Big Slide.*—I regret that the very favourable expectations entertained last fall regarding this company have not so far been realized. Various obstacles to the chlorinating process required to separate the gold from the ore resulted last spring in shutting down the works and discharging the whole of the workmen. Up to the present nothing further has been done, the whole of the works and costly plant of the company being now in charge of one watchman. Grave errors have been made by the management, notably in the construction of the road into the mine, the location of the buildings too near to the high water mark of the river, and others of a minor nature, but it is sincerely to be hoped that the company will ere long see the way clear to going on with the work. If sulphuret ores, even of a low grade, can be worked on a paying basis in other lands I fail to see why they cannot be made to pay here.

"The result of the failure of this company to extract the gold from the sulphurets has, in this district at least, been most disastrous; prospectors will not touch anything that shews sulphurets, and, since the discovery of free gold-bearing quartz on Cayoosh Creek, have run to the other extreme, and will not look at anything unless shewing gold to the naked eye, or under the magnifier. The claims recorded on the extension of the Big Slide Ledge have all been abandoned, and, in fact, sulphuret ledges everywhere in the district.

"A gold-bearing ledge was discovered by Messrs. Gould and Ward on Cayoosh Creek, about 10 miles above its confluence with Seaton Lake Creek, early in September last, and six claims were then located. This ledge has been subjected to violent upheavel, as fragments of it are found far from the line of ledge. It seems strange that, like the alluvial workings on Cayoosh Creek, this ledge, and others in the immediate neighbourhood, should have remained so long undiscovered, as nearly any piece of the surface croppings shews free gold. The Chinese miners found some fine specimens in their claims below the line of ledge, notably one in the possession of Mr. Smith, valued between $70 and $80.

"Several assays and milling tests from different places on the ledge have been made in Victoria and San Francisco, the former shewing from $4 to $105, and the latter from $5 to $48 per ton.

"A shaft is being sunk on the Discovery claims, and at the present writing has reached a depth of 25 feet, the ore from the shaft at different points, tested by reducing to powder and

washing, shewing excellent prospects at any point in the shaft. The ore in the ledge is composed of a yellow-tinged quartz, thickly interspersed with slate; both quartz and slate carrying free gold. A continuation of the Discovery ledge has been found on the north side of Cayoosh Creek, and several claims located, on one of which a shaft will shortly be commenced. A supposed continuation of this ledge has also been discovered on Anderson Lake, and three locations recorded on it. From one of the latter an assay made in Victoria gave $17.50 per ton. The value of these ledges being established by thorough prospecting in the first instance, there should be no difficulty in inducing capital to take hold of them for practical working. They are naturally placed in excellent position for working either by tunnels or shafts, not difficult of access, and the motive water-power for driving machinery unsurpassed.

"Five mineral claims, said to be free gold-bearing, were located on a ledge on Big Bar Creek a short time ago, but at present I am not well enough acquainted with their nature to report on them.

"I have, &c.,
(Signed) "F. SOUES,
"*Gold Commissioner.*

"*To the Honourable*
"*The Minister of Mines.*"

YALE.

Kamloops Division.

MR. DODD'S REPORT.

"KAMLOOPS, B. C., 24th December, 1887.

"SIR,—I have the honour to forward my mining report for the Kamloops Division of Yale District.

"*The Stump Lake Mines.*

"A new and enormously rich mining district. Thirty miles south of Kamloops, by a good wagon road, in the Nicola District, a number of claims have recently been located, and considerable prospecting work done. The principal locations are among the hills in the valley between Stump and Nicola Lakes. The former lake is about seven miles long and one mile wide. It derives its name from the number of stumps projecting alove the surface of the water, indicating that a forest formerly covered the ground which now forms the bed of the lake.

"The formation of this district is dorite, flanked in the east and in the west by granite ranges, and is similar to that of the richest silver mining districts in Mexico. Bukart, a mining expert, who lived many years in Mexico, classes this rock as dorite, but Bustamante, an authority of great weight, calls it syenite. It presents many of the characteristics of chlorite slate, a blue chloritic slate and a blue agillaceous slate. In the Mexican mines this formation has been found to be the chief feeder of the silver-bearing lodes, which have been worked for centuries, and yielded enormous fortunes. Messrs. Scott & Palmer, of Nicola, discovered valuable ore near Stump Lake some five years ago, and took up a number of claims. Very little development work was done for some time. A Mr. Winters became interested in the property; he worked for a few months on the claims, and then abandoned them in the fall of 1885. Mr. John Morrison, formerly of Montana, who was prospecting in the valley at this time, re-located the claims, and organized a company to prosecute the development. The company, known as the Nicola Milling and Mining Company, was composed of parties in Victoria, New Westminster and Nicola, with Mr. Morrison as manager; under his supervision work was carried on for two years at a cost of $12,000. Eight claims were taken up, and five shafts were sunk to a depth of from 20 to 50 feet, a number of leads were struck from two to three feet wide, containing gold, silver, copper and galena, all assaying from $40 to $80 per ton in gold and silver, besides copper and galena. This year the property was sold to the Nicola Mining Company, a strong syndicate of capitalists, of London, England, who are represented by Messrs. Wilson and Turner, of Victoria. This company took possession of the property in August last, and have been working from 14 to 20 men for the last three months; six shifts of men have been working night and day for some time, sinking shafts, building

shaft houses, leveling dumps. They intend sinking four of the most promising shafts to a depth of 110 feet, and if the outlook is as encouraging at that level as it is at the present time, the work will be continued.

"During the past 12 months 200 claims in the district have been recorded in the Government Office, at Kamloops, many of them being taken up by residents of the neighbourhood. The limited prospecting done has demonstrated the existence of over fifty ledges on Mineral Hill and Idaho Mountain, all of which carry more or less mineral. Mining men from California, Nevada, Idaho, Montana and Colorado, who examined the locations during the past season, have expressed their surprise at the large number of quartz veins highly mineralized near the surface, and have freely admitted that they never before were in a mining camp where, from the grass-roots down, there was such a prospect to rich mines. The majority of the veins on Mineral Hill run almost due north and south with an easterly dip, but there are a dozen or more which have a north-west and south-east course, and several which run almost east and west, and intersect the north and south and the north-west and south-east ledges, the whole forming a complete network of mineralized veins. It is considered highly probable by experienced miners that at a certain depth some of these veins will come together and unite in large ore bodies, as has been the case in other mining countries of somewhat similar characteristics.

"*The Leading Mining Claims.*

"The Nicola Mining Company have a number of claims on Mineral Hill, east of Stump Lake, prominent amongst which are the Joshua, a vein three feet wide; has two shafts, one being 30 feet deep, and the other 90 feet deep. These shafts will be run down to a depth of 120 feet. There are about 200 tons of good ore taken out at this claim, running from $40 to as high as $350, and averaging $100 per ton. The King William has four shafts, from 20 to 55 feet, with various cross-cuts on a vein about three feet wide, on which work is still being carried on. There are 100 tons of ore taken out, assaying from $35 to $250 per ton, and averaging about $70 per ton.

"The Gentle Annie has one shaft about 50 feet deep, which will be continued to a depth of 100 feet. The ledge is three feet wide, and there are about 15 tons of ore taken out, averaging from $20 to $50 per ton. This shaft is being sunk by contract.

"The Tubal Cain is the most promising ledge in the district; has been prospected on three different ledges, and about 10 tons of ore taken out. A shaft has been sunk some 35 feet, and will be carried down 100 feet. The width of the ledge, which is very rich, is two feet; it averages about $150 per ton—one assay going about $400 per ton.

"The Schomberg has a ledge 4 feet wide, and a shaft has been sunk 36 feet. The ore is estimated at $50 to $60 per ton, but no assay has been made yet.

"The No Surrender is about a 10-inch ledge. There are some 20 tons of ore on the dump, assaying from $25 to $60 per ton. The character of the ore in the above shaft is grey copper, galena and sulphurets

"Mr. Morrison, who has resigned his position as manager of the Nicola Mining Company, will be succeeded by Mr. Wm. Craib, who has been manager of the British Columbia Mining Company, at Cariboo, for the past year. The Company have recently secured three sections of land for grazing, timber and water purposes, with a view of erecting smelting and reduction works if prospects continue to reward the enterprise. A blacksmith's shop, cook-house, storehouse, and a number of camps for the employés have been erected. The pay-roll of the company for October was $500, for November $2,000, and this month it is estimated $1,200 at least. Between $17,000 and $18,000 has been spent on this property, directly and indirectly, and it is estimated that there is at the present time about $20,000 worth of rock on the various dumps. In all of their claims ore was taken out from the surface; not more than six inches of excavation was required in any case to strike the ore veins.

"Shipments of ore have been sent to Idaho, San Francisco and Denver, but it is expected that next spring will warrant arrangements for treating the ore in the vicinity of the mines.

"The Star claim, adjoining Tubal Cain, and running parallel with it, is at present the deepest shaft on Mineral Hill. It is owned by Messrs. G. Henderson and W. D. Patterson. The shaft is down 110 feet on a three-foot ledge of good ore. Some drifting has been done at the bottom of the shaft, and prospects are most encouraging, the ledge holding out and increasing in body and value. The ore runs from $30 to $150 per ton. Work will be resumed on this property in the spring. The gangue of ore in the Star is porphyry and quartz, each

forming a separate body, and may be called a dyke lode. The surrounding country rock is a metamorphic slate. Messrs. Kinstall & Co., of San Francisco, who have worked the ore by various processes, state that, although it is of a refractory character, it will not be difficult to treat. The breadth of ore body at the surface having a quartz gangue was two feet; at 100 feet in depth the quartz increases in breadth, forming an ore floor, and partially cutting out the porphyry; this floor shows mineral throughout the mass.

"The Planet claim, at the foot of Mineral Hill, is also owned by the above firm. The depth of the shaft is 35 feet; the ore on the dump is good, averaging from $35 to $150 per ton, gold predominating.

"Messrs. Wright and Fletcher are the owners of several promising claims, among them are the Minnie, on Minnie Hill; the Eureka, on Rockford Hill; the Banner and Idaho, on Idaho Mountain. No great amount of sinking has been done upon any of these claims so far, but there has been enough work to show ore richly mineralized. There is every prospect of American capitalists, in conjunction with Messrs. Wright & Fletcher, pushing the development of their claims early next spring in a vigorous manner.

"The Hepburn group of mines, on Idaho Mountain, owned by Messrs. J. Hepburn, W. Wilson and R. Dunsmuir, of Victoria, gives promise of developing into a valuable property. Besides the work required by the Mineral Act, a shaft has been sunk 33 feet on the Robt. Dunsmuir. The width of the ledge is two feet, and there are 12 tons of ore in sight, assaying from $65 to $800 per ton.

"The Mary Reynolds has two shafts, one 35 feet, and the other 90 feet; the latter will be sunk deeper. The width of the ledge is from four to six feet, and there are 70 tons of ore on hand, the lowest assaying $350, and the highest $900 per ton.

"Gold Cup shows a wide ledge opened up with a shaft 10 feet deep, the assay goes $90 per ton.

"The Giant is also a wide ledge, an 8-foot shaft, and about 12 tons of ore, assaying $200 per ton. The ore on Mineral Hill carries carbonates, galena, and black sulphurets of silver.

"Elk Horn, a 15-foot shaft, with a wide, ledge has 30 tons of ore in sight, assaying fair.

"The King Hiram, one of the most promising claims in the claims on the hills, is tapped in three places, and assays from $30 to $80 per ton; the width of the vein is 26 inches. Mr. W. McCulloch, Drs. Jones and Dearden are the owners of a number of claims, called the Jenny Long, Longfellow, Dentist, Nellie Grant, and Last Chance. The Jenny Long is evidently a first-class claim, carrying telluride of gold, which assays into the thousands. There is also quite a pile of ore on the dump, which will average $80 per ton at least. Very little work has been done on the other locations as yet. The ore is composed of galena sulphurets and blende in a quartz matrix, between walls of syenite.

"Messrs. Turner, Wm. and Joseph Wilson have about 20 claims, besides their interest in the Nicola Mining Company.

"Messrs. W. Palmer and R. Scott, of Nicola, have five or six claims, on which have been sunk from 12 to 20 feet, with encouraging results.

"*Placer Mining*

"The placer mines are still being operated on Tranquille Creek by Chinese exclusively. No definite information has been obtained as to the productiveness, but it is believed to yield only small returns.

"On Scotch Creek some $3,000 was taken out by white miners, who have abandoned the property, and only half a dozen Chinese were left at the Creek last month.

"The mining prospects for next year are excellent, and the Nicola District promises to prove one of the richest mineral regions yet discovered. The influx of capital necessary to properly develope this valuable property will prove of great benefit to Kamloops, the business men being fully alive to the advantages which will issue from the successful operation, on a gigantic scale, of this wonderfully rich mineral district.

"I have, &c.,

(Signed) "WILLIAM DODD,

"*Mining Recorder.*

"*To the Honourable*

"*The Minister of Mines.*"

Okanagan District.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE, VERNON,
"OKANAGAN, 9th December, 1887.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the District of Okanagan :—

"The amount of gold taken out on Cherry Creek averages about the same as last year.

"During the summer I visited this creek and tested some of the Chinese claims by panning out several pans of dirt, and satisfied myself that they were very slightly remunerated for their work after stripping from 20 to 25 feet of a bank to get down to the pay streak, which is about four inches from the bed-rock. Seven white men have been prospecting—running tunnels trying to find the lost lead.

"The Cherry Creek Mining Company have been working steadily running a tunnel all summer, and expect to strike the channel some time during the winter. Mr. Donald McIntyre has been working with a party of men on the Monashee quartz ledge, and taken out some very good ore, some of which he has taken with him for the purpose of having it assayed, and he informs me that he is as sanguine as ever that he has a rich silver-bearing ledge.

"The Cherry Creek waggon road is now completed within four or five miles of the Monashee quartz claims, and with a small expenditure being put on the unfinished portion next summer a good road could be built to the claims, which would be a great boon to the miners who have to go in every summer to work them.

"The Mission Creek Hydraulic Company did considerable prospecting this summer, but found that the hydraulic apparatus they were using had not sufficient force to remove the cemented gravel fast enough to remunerate them, and from what I can learn the company intend putting on their claim next summer a hydraulic giant, with iron pipes, as they are confident with a sufficient force of water they will overcome the difficulty, and in time will be remunerated for their perseverance and outlay.

"I have, &c.,
(Signed) "W. DEWDNEY, *G. C.*

"*The Honourable the Minister of Mines.*"

Similkameen Division.

MR. TUNSTALL'S REPORT.

"GRANITE CITY, December 24th, 1887.

"SIR,—I have the honour to forward the mining statistics of the Similkameen District for the season, exhibiting a yield of $128,000. The high stage of water, which existed until the middle of July prevented the river claims, and those operated in the channel of Granite Creek from being worked before the beginning of August, has had the effect of lessening the output of gold to a perceptible degree.

"The greater portion of Granite Creek worked last year, was again mined by Chinese, in many instances with good results. The benches on which gold was found yielded from $4 to $16 per day to the hand. The Pogue Company lately struck pay in their tunnel, which returns a litle over 2 ozs. to the set; and the Gladstone Company, about one-half mile below, is breasting out twenty-four feet wide, in gravel, which pays from three to four ozs.

"It is now the general opinion that these benches possess the continuation of an auriferous deposit which extends for a much greater distance than hitherto supposed, and finds an outlet above the mouth of Granite Creek in a low sag in the mountain. Two companies have been recently organized for the purpose of testing the existence of this old channel.

"Collins, Cedar, Slate, and Bear Creeks attracted very few miners the past season; whilst Champion, Hines, and Eagle Creeks have remained deserted, although no work has been done on them to determine their value.

"Boulder Creek has been industriously mined for near a mile from its mouth, and paid from $3 to $4 per day to the individual. Above the cañon some good spots are being worked by a few white men, but the lead is not sufficiently regular to be relied on. The claims are principally owned by Chinese.

"The auriferous deposits of the Tulameen River have proved remunerative only in certain localities, where the high bed-rock enabled mining operations to be pursued without the erection of expensive wing-dams and pumping machinery. Some of the bars have yielded good returns; but many of these placers have been exhausted of their wealth in past years, and stretches of a couple of miles, or more, frequently intervene where a single miner cannot be encountered.

"The same can be said of the Similkameen River, which has been continuously worked by Chinese for a period of over twenty-six years. It is, therefore, no wonder that the majority of the claims should yield only small wages. The day is not distant when the search for gold in its present channel will be confined to a few solitary miners. Mining on this river has been prosecuted for a distance of twenty-five miles, and since 1860 has produced many thousands of dollars of which no reliable record has been obtained.

My remarks in reference to the streams mentioned only apply to the localities which have hitherto been worked. Many of the gravel benches, which extend up these two rivers, afford a wide and remunerative field for the investment of capital, in the construction of ditches, and the purchase of the necessary apparatus for working them by the hydraulic process. As the country becomes opened up the wealth possessed by the more remote districts will attract public attention, and advantages such as these will no longer remain neglected.

"During the autumn an excitement was caused by some Indians finding coarse gold on Five Mile Creek, which is about 60 miles long and empties into the Similkameen River. It takes its rise in the same divide as Nicola Creek and follows a southerly course.

"Messrs. Donald Rankin, James Turley, and Angus Lamont, three experienced Cariboo miners, purchased an outfit and travelled down the stream a distance of thirty miles. They returned after an absence of five weeks, and reported having found mines which will pay $2 per day to the hand. The gold is fine, and exists in a stratum of gravel near the surface. It extends for a distance of ten miles, after which a granite formation intervenes in which no prospects could be obtained. The country is described as having an altitude of about 3,000 feet, and encumbered with burned timber in every direction. The creek has a favourable grade, possesses a large quantity of water, and fine looking benches exist along its course.

"A large body of Chinese will proceed there next summer, and probably some whites will follow in hopes of obtaining something better. I may mention that the production of platinum for the past season is estimated at 2,000 ounces. It now commands from $2.60 to $3 per oz., according to quality. It is a remarkable fact that many thousands of ounces of this rare metal has been thrown away by the miners as worthless, in consequence of the prevailing ignorance as to its true value. Last year samples were sent to various places, but the information elicited was so vague and contradictory that it only commanded 50 cents per ounce. The most favourable reply was received from Manchester, England, which stated that it would be worth $2.50 per ounce in Germany if consigned in large parcels; $3.50 per ounce is at present readily obtained for it in Portland, Oregon.

"Wm. Jensen, a reliable gentleman, whose long and varied experience in California and elsewhere constitute him an excellent authority in mining matters, visited this place on his way to Rock Creek, whilst representing the interests of several prominent business men of Victoria and the Mainland, and spent two weeks on the Upper Tulameen, above Bear Creek, examining the quartz ledges and benches which exist in the vicinity. At my request he embodied the result of his investigations in a report, which I take the pleasure of forwarding for publication.

"As it contains all the information concerning some lodes discovered a few weeks before his arrival, it will not be necessary for me to comment upon a subject, the particulars of which he has supplied in his communication.

"Before I conclude it may not be irrelevant to mention the great hardship inflicted by the neglect of the postal authorities to provide a mail to this place. The official returns show a population of 437 persons engaged in mining, exclusive of the inhabitants in the town and ranchers in the Upper Similkameen Valley, all of whom obtain their mail matter at Granite City, which may be considered a distributing centre for five hundred men.

"It seems very unreasonable that whilst small settlements, containing not one-fifth the population, are supplied with postal facilities, an important community such as this should be completely excluded from the outer world.

"The lack of a mail service subjects the Provincial Government to considerable expense for the transmission of official documents; is detrimental to public and private interests, and imposes an amount of inconvenience which cannot be expressed in words.

"I have, &c.,
(Signed) "G. C. TUNSTALL,
"*Gold Commissioner.*

"*To the Honourable*
"*The Minister of Mines.*"

MR. JENSEN'S REPORT.

"GRANITE CITY, September 21st, 1887.

"DEAR SIR,—In accordance with your request of even date, in regard to my impressions of the values and character of the quartz lodes and gravel deposits of this portion of British Columbia, I beg leave to make the following answer:—

"I arrived at Granite City on the 4th of the present month. The following day I started up the Tulameen river, a distance of twenty miles from this point, and on my way closely observed the formation of the country, and its possibilities, both in regard to quartz and gravel; and the following are the conclusions I have reached:—

"To prelude my remarks about the general character of the country, I beg your permission to describe partially a few of the claims met with on the way. I first visited the quartz location made by Messrs. O'Donnell, Kelly, Buttermore, and others. These gentlemen are at present engaged in bench mining, and meeting with fair success; but as this class of mining has necessarily to stop for the season, on account of the near approach of winter, they have turned their attention to quartz, and this is the result of their efforts: Mr. O'Donnell and his associates have located a ledge, called the 'Hidden Treasure.' It is situated on the north bank of the Tulameen River, about 16 miles north and west from this place. The ledge is about 8 feet in width; it is enclosed in slate walls, and is, no doubt, from close observation, a true ledge. It is very free in gold; any part of the rock, broken up by the mere primitive method and washed in a common miner's pan, showing innumerable particles of gold. Rock has been sent from this location for assay, but returns had not been received at the time of my departure. My belief, however, is that it will reach $100, and over, in free gold.

"Extensions on this lode, called the Gold Hill, Evening Star, and one more, whose name now escapes me, have been made. They show the ledge cropping freely across the divide into Bear Creek, a tributary to the Tulameen. The croppings show similar rock to the Hidden Treasure. No work has as yet been done upon these extensions, but preparations are now being made to do so.

"About three-quarters of a mile south and east from the above ledge, and up the Tulameen, another location has been made. It is owned by Mr. Buttermore, the locator; Mr. Jensen, of Victoria; and Mr. Fell, of the same city. Rock from this ledge, which is called the Bonanza Queen, has been sent to Victoria for assay, and has yielded the handsome return of $88 in gold and $12 silver per ton. Two hundred pounds of rock have also been sent to San Francisco for a milling test; the returns have not yet reached here. I understand it is the intention of the owners to immediately begin the construction of a tunnel, near the base of the mountain, which will penetrate the ledge at a depth of 600 feet. This lode is between three and four feet in width, and very promising. It is also easily traceable across the divide to Bear Creek by its croppings, and has, as all the ledges here have, a general course of N. 21° W. to S. 21° E. The extensions of this ledge have also been located, under the name of the 'Star' and the 'Genesta,' upon both of which work will soon be commenced.

"Some two miles further up the river a location has also been made, named the 'Union.' This ledge is owned by three parties, two of whom are residents here, and one a gentleman residing in Victoria. It is a large ledge, being about 12 feet in width, and showing unmistakeable evidences of being a rich mineral deposit. My opinion, however, is that silver predominates. A shaft is now being sunk upon this ledge, to more fully prove its character. Upon the south-east bank of the Tulameen two other locations are made, one called the

'Albion.' The other is named the Cascades, and is an extension of the former. They are both four feet in width on top, and carry a little free gold, and though not rich, it is my belief that by sinking on they will be found valuable properties. They are both owned in Victoria, and I understand that work will shortly be begun upon them.

"This is all that has yet been done in this vicinity in regard to quartz, though I understand that prospectors are now in the field looking for veins, and I have no doubt their labours will be well rewarded.

"In regard to gravel deposits, I would like to say that I have examined both banks of the Tulameen River up to Eagle Creek, a distance of 20 miles, and also Granite Creek (the principal tributary of the Tulameen) 6 miles, and find that along both streams numerous benches, both high and low (as they are here termed), exist, embracing from 10 to 50 acres in extent each. They are from 20 to 100 feet in height, and have a dumping facility of 50 feet into the rivers. The wash, however, is what is known as a river wash, and therefore necessarily very heavy in character, and requiring a large body of water to move the gravel sufficiently rapidly to insure success. Inspecting the various creeks that empty into the Tulameen, to ascertain if they contained water in sufficient quantities to successfully work the various benches, under or with the hydraulic process, I found that though very flush for about three of the spring months, the volume of water thereafter rapidly diminishes, owing to the steep nature of the country, which causes the rain rapidly to run off. The same steep character of country also precludes the idea of successfully erecting storage reservoirs. On this account, the idea of working the benches by the hydraulic process, successfully, would be a very difficult matter. There is, however, a solution to this difficulty, by which sufficient water may be obtained to successfully work those extensive gravel benches, and extract profitably the immense wealth which they contain.

"If a company were formed for a ditch enterprise, and proper surveys made to determine its feasibility, I believe that a dam might be constructed across the Tulameen, where it is joined by Champion Creek, a distance of 24 miles from Granite City. The cost of the dam would be about $2,000; the cost from the dam to ditching ground, on top of bench, $2,000; after which fair ditching ground at a cost of $1,000 per mile—affording a sufficient and continuous flow of water. The whole distance, of course, need not be built at once. If this or something similar be not done, the immense and almost incalculable wealth now contained in these gravel beds will forever remain dormant.

"With your permission, I will add these remarks: The country is almost untrodden, and has vast mineral resources, both in quartz and gravel, that only await time to discover, pluck and energy to develop.

"I am, &c.,
(Signed) "J. N. JENSEN.

"*George Tunstall, Esq.,*
"*Gold Commissioner.*"

COAL.

The following table shows the output of each year from 1874 to 1887, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070
1885	365,000
1886	326,636
1887	413,360

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.
"27th January, 1888.

"SIR,—I have the honour to respectfully submit my report as Inspector of Mines for the year 1887 for your consideration, in pursuance of the 'Coal Mines Regulation Act, 1877.'

"The following collieries have been in operation during the year, viz.:—

"Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.

"Wellington Colliery, owned by Messrs. R. Dunsmuir & Sons.

"East Wellington Colliery, of R. D. Chandler, Esq.

"The output of coal for the year ending 31st December, 1887, amounted to 413,360 tons, as follows:—

Nanaimo Colliery, output	138,712	tons.
Wellington Colliery "	239,217	"
East Wellington Colliery "	35,431	"
Total output in 1887	413,360	"
Add coal on hand 1st January, 1887	23,593	"
Total coal for disposal in 1887	436,953	"

"The exports of coal during the same period amounted to 334,839 tons, as follows:—

Nanaimo Colliery, export	114,815	tons.
Wellington Colliery, "	187,193	"
East Wellington Colliery "	32,831	"
Total coal exported in 1887	334,839	"
Add home consumption in 1887	99,216	"
On hand 1st January, 1888	2,899	"
	436,954	"

"The exports were made principally to the ports of San Francisco, Wilmington, and San Diego, in California; numerous shipments were also made to Portland, Oregon; Alaska; Petropavloski; the Hawaiian Islands; China and Japan (per C. P. R. steamships); and coal has been regularly furnished to H. M. Navy; and to U. S. war and revenue vessels; also to ocean mail steamers, and other vessels calling for supplies of fuel.

"The aggregate quantity of coal produced and exported by the Vancouver Island collieries in the year 1887 exhibits a very gratifying increase over previous years' results, as will be seen by the following table, viz.:—

	Output.	Export.
1884	394,070 tons	306,478 tons.
1885	365,596 "	237,797 "
1886	326,636 "	249,205 "
1887	413,360 "	334,839 "

"The 'home consumption,' which includes coal used in the collieries, was 99,215 tons for 1887 against 85,787 tons returned for 1886.

"The following statament gives the standing of British Columbia in the State of California, the largest market for our coal, during the past four years, viz.:—

	1884.	1885.	1886.	1887.
	Tons.	Tons.	Tons.	Tons.
British Columbia (including 64,395 tons to Wilmington and San Diego in 1887)	291,546	224,298	253,819	324,949*
Australia	190,497	206,751	287,293	155,649
England and Wales	108,808	170,656	160,869	91,248
Scotland	21,143	20,228	19,795	12,615
Eastern States (Anthracite, &c.)	38,124	29,834	19,517	24,102
Seattle	125,000	75,112	57,552	199,079
Carbon Hill	122,060	157,241	124,527	179,526
Green River, Mount Diablo, and Cedar River	77,485	71,615	90,664	121,791
Renton, Newport, and South Prairie	60,413	67,604	73,654	69,314
	1,035,076	1,023,339	1,087,690	1,178,273

"The above statement includes a few cargoes of coal hauled from Banff over the Canadian Pacific Railway last year, and shipped at Burrard Inlet for San Francisco. It should also be mentioned that, excepting in the case of British Columbia, the statement does not comprise the coal received into Wilmington and San Diego in 1887, which has been computed by commercial authorities (in the absence of Customs returns) to aggregate from 175,000 to 200,000 tons. So that even at a moderate estimate the State of California alone is a customer for coal to the extent of about a million and a quarter tons per annum. This market, together with other usual avenues of trade, gives considerable scope for the expansion of the coal industry of British Columbia, of which, I have no doubt, our enterprising colliery proprietors will fully avail themselves during the coming year by increasing the output of mines already in operation, and by starting other mines which have been held in reserve awaiting the revival of trade, which has at last been realized.

* These totals represent the quantity of coal actually *received in* San Francisco and other ports in California during the years indicated.

"NANAIMO COLLIERY.

"The coal in this colliery, as in all other collieries in this district, has been in good demand during the past year.

"No. 1 Pit, Esplanade, in Nanaimo.

"This mine, belonging to the Vancouver Coal Mining and Land Company, Limited, was fully described in a previous report. Everything about this mine, previous to the 3rd of May last, seemed to be in good order, no expense whatever being spared to make things safe. Ventilation was good, the motive power a large fan, as mentioned in my report, which fan, on 6th April last, was keeping in circulation 75,400 cubic feet of air per minute for the use of 142 men, or 530 cubic feet per minute for each person employed. The system of the ventilation at that time was on three separate splits—one division to what is known as the diagonal slope, which is to the south side of the main slope; and two divisions to the north side of the main slope, one of which went in the No. 2 North Level and connected with No. 1 North Level about 700 yards in from the shaft, where it went in and ventilated No. 1 North Level, which is now driven about 1,700 yards; the other division went down to the lower levels, where it also returns to and joins again at the bottom of the No. 2 air, or upcast, shaft. The main slope goes directly under the water of Nanaimo harbour for about 1,100 yards; and the 'diagonal' slope branches off the main slope about fifty yards down from the head, and at an angle from the main slope of fifty-four degrees; this diagonal slope is down about 700 yards. Here the coal is from seven to fifteen feet thick. In this part of the mine a considerable quantity of gas was given off, but the ventilation was so good that there was no chance for it to collect; and at no time previous to the 3rd May did I see any gas there. Sometimes I took a safety lamp (Clanny), and at other times I carried a naked light. I generally made my inspection when the mine was at work, so that I could see the general condition of the mine and hear if there were any complaints to be made. I went into the old works, as well as into the places where the miners were working. There were two shifts of men working in all the stalls, and in some of them three shifts worked, the one shift relieving the other. There was a fireman on each shift going through the workings and examining through all the places. On the 3rd May all the places had been examined by the firemen as usual, and everything appeared to be in good order, and all the works went on apparently in safety, when a few minutes before six o'clock p. m. those on the surface were alarmed by a noise from both the hoisting and air shafts, accompanied by smoke and timber flying out of both shafts, and it was evident that a dreadful explosion had taken place in the mine. Shortly afterwards the No. 2 or air upcast shaft kept sending out smoke, which showed that the mine must be on fire. At the same time there were 154 men in the mine. The downcast was somewhat deranged, but the cage was got down as soon as possible, and when close to the landing it was seen that the cars, both loaded and empty, were piled up and twisted into every conceivable shape By the time I got to the shaft I could see the flames coming out of the upcast shaft, and the ventilating fan and fan house were on fire. In a short time all the wood work of the fan was consumed, leaving a mass of iron distorted and ruined; also the large driving engine of the fan, all destroyed by the intense heat. On getting to the shaft the cage came up and I went on, other four along with me, this being the second descent of the cage after the explosion. After some delay we got to the bottom, and went from amongst the piled-up cars to the entrance of the engine-room. I could see the fire getting into it, and as there was so much air travelling the fire soon had the timbers burned out, and was making good headway for the level road at the head; but before all this had taken place I, as well as others, went down the slope, and also in the levels as far as could be got for afterdamp, but could not find any person. A party also went towards the bottom of the upcast shaft, where it was known there were some men working, and about the engine-room; and there, and on the other side of the shaft (where the foreman was found), seven persons in all were got out, who were all that were got out alive of the 154 that went down to work on the afternoon of the 3rd May. Everything was done to get in to the men that it was possible for men to do; and amongst the exploring party there was one man, Samuel Hudson, was overcome by afterdamp and died from its effects. In the meantime the fire in the engine-room had got almost into the level, and this had to be mastered or no hope could be given for getting out any of the men alive, and nothing could have saved the mine but flooding it from the sea. Buckets with water kept the fire back until the fire engine from the city was got down, there being plenty of water close at hand. The engine was

worked mostly by the seamen from the shipping in the harbour. The pumps were kept going for about two weeks before it could be said that the fire was extinguished; and during all that time there were exploring parties in the mine looking for the lost, of whom none were got out alive excepting those already mentioned, and who were near to the bottom of the shaft; and there are still some bodies in the mine, viz.:—Jonathan Blundell, Robert Nicholson, George Biggs, Thomas Dawson, Thomas Hughes, and two Chinamen. There had been a continuous search for the bodies up to the 27th July, when it was discovered that the *debris* in the workings of diagonal slope was heating, and liable to burst out to an active fire at any minute, so that this part of the mine had to be filled with water, and that is how it stands at present, but the company intend soon to commence taking out the water. This operation will take a long time. Another engine has been erected at the head of the slope in place of that which was destroyed by the burning of the engine-room. The main slope is being cleared up, and it is expected to get into the face of No. 3 North Level in a week or two, when coal can be again taken out. The No. 1 North Level has been put in order some months ago, and this is the only place from which the company have got out any coal since the explosion, and here there are only a few men working. Ventilation here is very good; there has been little or no gas seen in this division, and it is free from dust. The motive power of this ventilation is a 'Murphy's Mine Ventilating Fan' imported by the company from Chicago; but they have on hand a duplicate of the fan and driving engine, which were destroyed as above mentioned.

"After the public enquiry that has been made into the terrible accident of the 3rd May, conducted by Mr. Eberts for the Crown, at which enquiry the Vancouver Coal Company were represented by Mr. Drake, Q. C., and Mr. James Young appeared for some of the widows and orphans, I do not think I can do better than refer you to the record of the inquisition filed in the office of the Hon. Attorney-General, in case you should desire to ascertain further details of the lamentable occurrence.

"No. 3 Pit (Chase River).

"This shaft was put down last summer by the Vancouver Coal Company, on the east side, and near the mouth of Chase River. The coal was struck in the shaft on 14th July, at the depth of 67 feet from the surface; the coal, in the shaft, was 8 feet 6 inches thick, making the total depth of the shaft 75½ feet. Work has been continued here steadily since the shaft was put down, and the coal has proved to be very good and hard, although varying in thickness from 8½ to 3½ feet. As this pit is near to the crop-out, the company, as well as running the level to south-east, are driving a slope.

"Ventilation is good; motive power a furnace. There has not been any gas found in this mine; there is no dust, as the floor is wet throughout. To the south east of the above pit the company have started to put down another shaft, and are making good headway with it. They expect to reach the coal in about one month from the present time. This is to be the return from the No. 3 Pit, and as the level is close to the place where the shaft comes down, there will be a connection made at once, after they get the coal. From this mine the company have got out a considerable quantity of coal, considering that they only started to sink on the latter end of May last; and to all appearances they are going to have a good mine.

"South Field Mine.

"At the time of my last report this mine was not working, but it was standing in a position that would allow of its being opened in three or four days; whenever trade would justify it; and that long-looked-for time came early in the year just passed, when it was opened again. The slope, which was down 600 yards, has not been extended. There are three levels from the slope to the east side, and two to the west side. The coal continues to keep very good, although there is some of it not very thick, and as a general rule the roof is good.

"Ventilation is very good; motive power a large fan on top of an up-cast shaft. This mine is also ventilated on the separate split system; there are three divisions—one to the west side, one to the east side from the slope, and one from the old South Field Mine. The lower workings give off some gas, but with ordinary care there cannot be any danger, as the current of air the last time I tested the air was 50,000 cubic feet for the use of 80 men. The floor of this mine is also wet throughout.

"On the 24th of November last, during the night, when there were only a few men in the mine, somehow or other the mine got on fire; but all the men soon came out. As the air

travelled so fast, the flames soon spread. It occurred at the entrance of No. 2 East Level, and the fire was so fierce that the management had to stop the fan, put in a line of stopping to keep the fire down, and afterwards had to fill the mine with water up to, or nearly to, the line of stoppings; after which, when they were satisfied that the fire was extinguished, they started to take the water out. During a great part of the time occupied in pumping out the water, the miners were employed in taking out pillars (of coal) from the upper old works, to help to keep up the supply. Now they have got the water cleared so as to be about to start at the bottom levels again. Here the workmen have not, as they have in the other mines, taken the liberty given to them by section 46, General Rule 31. I think it would be better for both the workmen and the company if there was a monthly inspection made of the whole mine by a party of those employed in it.

"WELLINGTON COLLIERY.

"This colliery belongs to Messrs. Robert Dunsmuir & Sons, and is situated in Mountain and Wellington Districts.

"WELLINGTON MINE.

"This mine has been fully described by me in previous reports. It is the original 'Wellington Mine,' being the place where the colliery was first opened. In this mine they have worked steadily up to about three months ago, taking out pillars (of coal). To the north-east, in connection with this mine, there is a piece of ground which the colliery proprietors have not yet worked. Here they have put down a shaft 37 feet to the coal, and they have the prospect of getting some more good coal.

"ADIT LEVEL.

"This is really a continuation of the Wellington Mine, coming out on the valley of the Millstone River. Here, at present, they are only taking out pillars.

"NO. 3 PIT (WELLINGTON COLLIERY).

"This is the shaft worked in the valley of the Millstone by Messrs. Robert Dunsmuir & Sons (with the exception of the shaft used as a fan or upcast shaft); and, as you will have seen in one of my previous reports, all the workings in this mine are by way of a slope. The coal is worked on the pillar and stall system, being the system upon which all the mines in this colliery are worked, and very large pillars are left to support the roof. Here they have a long stretch of workings in progress. The coal is very hard, and of the usual good quality of the Wellington coal. The miners have worked steadily the most of the year, there not having been anything unusual here to cause any delay. The coal is from 6 to 11 feet thick—all hard and good.

"Ventilation is very good. When I was down I found, on testing it, that there were 43,200 cubic feet per minute for the use of 68 persons. This mine is ventilated on the separate split system—two divisions to the north side and one to the south side of the slope,—the stall farthest away getting the air first on each division, then returning by way of the stalls to the upcast. The motive is a large fan on the top of the upcast shaft, this fan being the first fan erected in this district on a large scale. Now fans are the motive power in the ventilation of all our coal mines, that are of any extent. There is now little or no gas seen in this mine. Everything is kept in the best of order, with plenty of all kinds of material that is or may be wanted for the successful working of a mine. Here, as is the case in the other three extensive mines of Messrs. Robert Dunsmuir & Sons, the workmen send a committee every month to examine every part of the mine. (See section 46, General Rule 31.) This puts the workmen in a position to know the condition of the mine, as to its safety. The result of these examinations is recorded in a book kept for that purpose, and left open for inspection; so that it is useful for both manager and workmen.

"No. 4 PIT (WELLINGTON COLLIERY).

"This pit is put down on the top of a high bluff which overlooks the valley of the Millstone River. Mining in this pit is carried on very extensively by Messrs. Dunsmuir & Sons. Here, as in the other mine, they have been working steadily the most of the year, except when they have had to lay off for a day or two for necessary repairs.

"The coal is worked from what are known as the north and south side workings. These workings are by pillar and stall. The coal in this mine is very good, particularly on the north side, where they have had very little to trouble them in the shape of faults in the coal. On the south side the coal is also good, but they have been somewhat more troubled with faults, yet nothing serious, and not anything to hinder much. This mine is connected in different places with the No. 3 Pit, and if at any time it was necessary those in the No. 3 could come to No. 4, or those in No. 4 could go to No. 3; and besides this, there is an air shaft, which is called the No. 6 Pit, here, by means of which the men in the mine could be taken out or let down if occasion required.

"Ventilation is very good; motive power, a large fan on top of upcast or No. 6 shaft. This mine is also ventilated on the separate split system; the two main divisions are from the bottom of the one to the north, and the other to the south side; this on the north is again divided further in in the workings. In this mine I have seen it tested 104,000 cubic feet per minute for the use of 150 men and 8 mules; and on this place where the above-mentioned air was registered it was travelling about 1,300 feet per minute. This mine gives off some gas, but the fireman seldom sees any in going his rounds, when making his examination, as it has not got any chance whatever to collect. Everything is kept in the best of order, there being no expense spared to keep the mine in order and to make the works safe.

"Here, as in all the other mines belonging to Messrs. R. Dunsmuir & Sons, the workmen send a deputation every month to examine all the mine, and they enter the condition in which they find the mine in a book kept for the purpose, which is left open for inspection. These examinations are made when the mine is in its usual condition with the miners all at work.

"No. 5 PIT (WELLINGTON COLLIERY).

Messrs. Dunsmuir & Sons have worked this mine steadily the most of the year, the demand for their coal being good. To this mine there is a branch line of railway in from the Esquimalt & Nanaimo Railway, and coal is sent by this line. The Railway Company's locomotives go under the shutes of this pit and take in their own supply of coal. This No. 5 Pit is now, and to all appearance is going to be a very extensive mine. They have run a slope from the bottom of the shaft to the northward and eastward for about 300 yards, and in this they have got a fine seam of good hard coal; and away in front of the workings in this slope, quite a few hundred yards, they have put down a bore-hole, and in this they found the coal to be about eight feet thick, which proves that they have a very extensive field of thick and good coal. Messrs. Dunsmuir & Sons, as well as the community at large, may be congratulated on this extensive find of coal.

"Ventilation very good; motive power, a large fan on top of the upcast shaft. This mine is also ventilated on the separate split system, with five main divisions—two to the west, two to the east side, and one for the slope. The air is split into three parts close to the bottom of the downcast to east, and west, and slope; the east and west divisions being split further in in the slope. These divisions travel until they come back close to the upcast shaft, where they all connect into one volume and go out the upcast shaft. The last time I was down I found that the total coming from the different splits was 90,275 cubic feet per minute for the use of 170 men and 10 mules.

"In some of the places I was in I pointed out to Mr. Jones, the overman, that the brattice was a few feet too far back from the face; but I was told by the men working at the places I referred to that if the brattice was any closer they would have to quit working, as the air would be so strong they would not be able to get their lamps to burn, and I could see this was correct. There is one grand feature here, as in all the Wellington mines, and that is, that the airways are generally large. Here, as in all the mines of both Wellington and Nanaimo Collieries, in addition to the fan working, there is a steam jet ready to turn steam into the upcast in case anything should go wrong with the fan, or with the engine that drives the fan. Here there is also plenty of timber on hand, and every other thing that is necessary for carrying on an extensive mine.

"In this mine, also, in accordance with Section 46, General Rule 31, of the Coal Mines Regulation Act, the miners send round a deputation to examine the mine every month, the manager supplying them with all things requisite to enable them to make a thorough inspection, the result of which is entered in a book, which is left open so that those who sent the deputation can see the report of their examination. This practice cannot be too highly recommended, as it gives the miners confidence in their safety when they find everything in the mine as it should be, and on the other hand it lets them know if danger is lurking somewhere, where everything was supposed to be safe, and in such case they know where to apply.

"EAST WELLINGTON COLLIERY.

"This mine is the property of R. D. Chandler, Esq., of San Francisco. The coal worked here is what is known as the Wellington coal. The mine has been worked steadily most of the year, but as the proprietor has been limited to a certain number of men for the greater part of the year they could not get out much coal. What was got out was very hard and of good quality.

"This mine is worked on what is called the long-wall system, and it is very successfully carried out. The coal will average about three feet thick, and has a hard roof. The refuse from mining the coal, and rock taken from the roof to make the roadway, nearly fills the waste workings full, so that the roof does not settle much; and as the roof is strong and of a tough nature it bends down gradually behind the miners as they work out the coal, and as it generally keeps solid at the face the workmen hardly know that it is settling.

"Ventilation is very good; motive power a furnace, and at any time on making my examination I never found less than 185 cubic feet of air per minute for each person employed in the mine; and as the face of the coal where the mine is working is all one stretch, and no brattice required, the air having a direct road along the face of the working, except what escapes at the curtains, and that keeps the roadways clear from any bad gasses; and the coal being worked here 'long-wall,' the weight from the bending roof is on the coal face, so that very little powder is required to blast the coal, as after it is mined underneath the weight of the bending of the roof breaks it down. There is little or no gas found in the mine; and it is also free from dust.

"In my previous report mention is made of the west level being in 400 yards; but it should have read 1,400 yards; and here they had got a fault, putting the coal up thirty-four feet. Up over this fault they have only been working in the levels to find if the coal keeps good, and if it would justify them in putting down another shaft. Now they have been rewarded by proving a good field of coal, varying in thickness from five and a half to seven feet, of good quality and hard. As they have got confidence in their prospects, they are now putting down Shaft No. 2. This shaft is also in the valley of the Millstone River, and about half a mile nearer to Wellington than No. 1 Shaft. They have now got down eighty feet, and as the coal will be about 200 feet from the surface, they expect to get down to it in about two months. The railway is already extended to this new shaft, so that after coal is struck they will soon be in a position to send out quite a large output of coal per day from the new shaft, and also to greatly increase the output of the No. 1 Pit. The above-mentioned extension of works will be a great improvement in this district, and a benefit to the country in general; and it is to be hoped that it will be beneficial to the proprietor, as he is deserving of such success, seeing the perseverance and push he has made here in bringing about the present position and prospect of this colliery.

"PROSPECTING.

"There has been a considerable amount of work of this nature done during the past year. The most extensive was that of the Vancouver Coal Company in sinking or deepening what is known as their No. 2 or Air Shaft. This has been put down to what is thought to be the 'lower seam,' being 71 feet below the Douglas seam. In this shaft the lower seam is about six feet thick, but is much mixed with brown shale. This recent sinking makes the No. 2 Shaft nearly 700 feet deep. The Vancouver Coal Company are also putting down a bore-hole in their estate in Mountain District. They have now got down 384 feet, but have not got coal. Here they are looking for what is known as the Wellington seam. This company are engaged in putting down another hole with their diamond drilling machine, but this time it is in Gabriola Island, on

the south side and near to the False Narrows. This hole is down over 1,000 feet, but they have not struck any coal as yet. This is now the deepest hole in the district.

"Messrs. Dunsmuir & Sons have also put down one hole in which they found the coal; it is good and hard, and about eight feet thick. They are also putting down another hole away ahead of the workings of their No. 5 Pit, but at last account had not struck coal. In this hole they went through 184 feet of gravel, sand, and boulders, which makes very slow work.

"It is fully expected that all these places will give a good account of themselves before long.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES FOR THE YEAR ENDING 31ST DECEMBER, 1887.

"January 7th—John Culligan, miner, when at work in the No. 1 Pit, Nanaimo Colliery, was severely hurt about the head by a blow from a prop, the prop having been knocked out by runaway cars on the diagonal slope.

"January 10th—Frank Coyne, miner, was seriously injured by a fall of coal, while at work in his stall in the No. 4 Pit, Wellington Colliery. The above-mentioned Frank Coyne died on January 16th.

"January 11th—Aaron Barnes, miner, was slightly burned by the flame of a blown-out shot in the No. 4 Pit, Wellington Colliery.

"January 20th—Charles Gullion, mule-driver in No. 1 Pit, Nanaimo Colliery, was killed by falling off a run of cars drawn by a mule, the cars running on top of him.

"February 4th—A Chinaman, running coal in No. 5 Pit, Wellington Colliery, was injured by a car going over him.

"March 14th—Ah Clam and King Lun (Chinamen), running coal in No. 4 Pit, Wellington Colliery, were seriously injured by a fall of coal from the roof. The cars went off the rails on a self-acting incline, knocking out some props. The Chinamen above named went to put the cars back on the rails, when the roof came down on them. The above-mentioned Chinamen died, King Lun on 17th and Ah Clam on 22nd March.

"March 30th—John McNeil, miner, working in No. 5 Pit, Wellington Colliery, was slightly injured by a fall of rock from the roof, while at work in his stall.

"April 5th—S. Lorenzo, miner, got his leg broken by a fall of coal, while at work in his stall in No. 1 Pit, Nanaimo Colliery.

"April 19th—Thomas Harris, miner, was killed by a fall of coal, while at work in his stall in the No. 1 Pit, Nanaimo Colliery.

"April 25th—Ah Tong (Chinaman) got his fingers crushed by a piece of coal falling on them while pushing a car in No. 4 Pit, Wellington Colliery.

"May 3rd—The following persons were injured and killed by the explosion in the No. 1 Pit, Nanaimo Colliery (that is to say):—

"*Injured.*

"George Davis, John Jones, James Stove, senior, John Lynch, Jules Michael, Richard Gibson, overman at time of explosion.

"*Killed.*

"Bodies got out May 3rd—John Linn, Frederick Mattison, William L. Davis, William L. Cochran, John Smith, Samuel Hudson, one of the explorers; Chinamen, names unknown, Nos. 3, 71, 72, 73, 77, 83.

"Body got out May 5th—Michael Lyons.

"Bodies got out May 6th—James Davy, William Davy, Andrew Muir, Thomas Evans, Evan Jones, Hudson Lee, John Stove, James Hoggan, James Isbister, Robert Stove, William Ridley, Herbert Bevilockway, John Morton, Andrew Morton, George Old, William Lukey, senior, George S. Bertram, Harry Westfieldt, William Lukey, junior, Abraham T. Lewis, Henry Lee, James Byres, Copley Woobank, John Woobank, Andrew Hunter, Joseph Forest, John Meakin; Chinamen, names unknown, Nos. 89, 100, 95, 84, 123, 117, 102, 104, 86, 87, 105, 97, 88, 92.

"Bodies got out May 8th—James Thomas, John Richards, Thomas Martin, Edward Wilkins, William Bone, Joseph Watson, James Milton, Edward Johns, John J. Smith, Edward Benton, Joseph Thompson, David Morgan, John C. Fallen, Jonathan Bramley, Arthur Ellis, James Campbell, George Bowden, George Simmons, John Stevens, William Gilbert, David Ellis, John Malcolm, John McGuffie, Benjamin Popplewell, Robert Buffington; Chinamen, names unknown, Nos. 107, 128, 136, 106, 108, 112, 90, 93, 96, 101.

"Bodies got out May 9th—Archibald Muir, H. Burn, G. Bartolero, Samuel H. Myers, Malcolm McLean, Roderick McDonald, W. John Morgan, Nicholas Johns, John Zermani, William Campbell, F. Allen, Peter Ducca, Michael Corcoran, Anderoti Fillippia, Arthur Meakin; Chinamen, names unknown, Nos. 98, 113, 114, 116, 118, 119, 120.

"Bodies got out May 11th—Chinamen, names unknown, Nos. 125, 122, 131.

"Bodies got out May 13th—Daniel Dawson, William Burns, Thomas Gorman.

"Bodies got out May 14th—Frank Tully, John Johnson, William Morris, Alexander McDonald, William Henry Stephenson, John Thompson, William Hoy, Charles Drake, Caton Willis, William Hagne, James Lyons, John Myles, William Scales, Allan Smilley; Chinamen, names unknown, Nos. 135, 127, 124, 133, 129.

"Body got out June 20th—Chinaman, name unknown, No. 132.

"Body got out July 28th—Thomas Perry.

"Bodies got out Octobor 15th—Chinamen, names unknown, Nos. 137, 142.

"Bodies got out December 10th—Chinamen, names unknown, Nos. 139, 140.

"*Missing.*

"Robert Nicholson, Jonathan Blundell, George Biggs, Thomas Dawson, Thomas Hughes; Chinamen, names unknown, Nos. 143, 145.

"June 20th—Alexander Orr, miner in East Wellington Colliery, had his leg broken by a fall of rock from the roof while at work in his stall.

"June 27th—Ah Tap, a Chinaman employed on the Departure Bay Railway, got his ankle slightly crushed between buffers of cars.

"July 8th—William Storrie, mule-driver in No. 4 Pit, Wellington Colliery, was slightly injured by being jammed between the cars that were being drawn by the mule.

"July 30th—Daniel Kilkpatrick, miner in No. 4 Pit, Wellington Colliery, was injured by a fall of coal from the roof while at work in his stall.

"August 19th—William Connick, miner in No. 4 Pit, Wellington Colliery, was severely injured by a fall of top coal while at work in his stall.

"August 19th—Ah Line, a Chinaman in No. 3 Pit, Wellington Colliery, got his leg jammed by a car in the mine.

"September 8th—Song Swen, a Chinaman, running coal in No. 1 Pit, Nanaimo Colliery, was hurt by getting his head jammed by a loaded box.

"September 16th—James Fisher, miner, working in No. 3 Pit, Nanaimo Colliery, was killed by a fall of rock from the roof while at work in his stall.

"September 19th—William Boyle, miner in South Field Mine, Nanaimo Colliery, was seriously wounded in the abdomen by a pick which he was carrying coming in contact with an empty car which was being pushed along the level.

"September 19th—V. Bogo, a miner working in No. 3 Pit, Wellington Colliery, by a piece of coal falling and striking him on the head and causing a severe cut over the eye.

"October 1st—Thomas Hardy, miner working in South Field Mine, Nanaimo Colliery, had his right arm seriously crushed by a fall of rock from the roof while at work. The right arm had to be amputated above the elbow.

"October 10th—Chung, Chinaman, mule-driver in the No. 3 Pit, Wellington Colliery, had his leg broken by a box running over him.

"October 19th—William Cope, miner, working in the No. 4 Pit, Wellington Colliery, received a compound fracture of the leg by a fall of coal from the roof.

"October 22nd—Ah Hin, a Chinaman working and timbering in No. 3 Pit, Wellington Colliery, was killed by the caving of two sets of timber, smothering him before he could be got out.

"November 11th—Thomas Renfrew, miner, working in the No. 4 Pit, Wellington Colliery, was injured by a fall of coal and dirt while at work in his stall.

"November 15th—A Chinaman, No. 209, was jammed about the body by cars in South Field Mine, Nanaimo Colliery.

"December 1st—James Rosewall, sinker in No. 2 Shaft, East Wellington Colliery, received a severe wound on the head by the falling of a plumb-bob down the shaft.

"December 7th—Jim, Chinaman, working with John McNeil, miner, was seriously injured about the head by a shot in No. 5 Pit, Wellington Colliery.

"December 20th—Ah Ling, a Chinaman, working with William McCullock, miner, in No. 5 Pit, Wellington Colliery, got his hip dislocated by a fall of coal on going into their stall after blasting.

"December 22nd—Chinaman No. 167, while cleaning the hoisting engine at the No. 1 Pit, Nanaimo Colliery, got his hand seriously crushed between the connecting rod and bed-plate of the engine.

"December 22nd—John Hall, miner, working in No. 5 Pit, Wellington Colliery, got his arm broken by falling on it.

"I am sorry to have to make out such a numerous list of accidents, both serious and fatal. There were 32 serious and 157 fatal accidents during the past year.

"On looking over the list you will observe that of the above-described accidents, 150 of those that were fatal, and 5 of the serious ones, occurred on the occasion of that sadly memorable explosion of the 3rd May last. Eleven of the casualties in the list were caused by falls of coal, four of them being fatal; eight were from falls of rock, two being fatal; eight by cars in the mine, one of which was fatal; two from a shot in the mine; one on a railway; one in a shaft during sinking; one by a pick; one by a hoisting engine, and one through a fall of the person injured.

"I have enquired into the circumstances of all those accidents, and public inquest has been held when necessary, at which all the evidence that it was possible to obtain was taken, and as the depositions and proceedings of all the inquisitions so held are filed in the Hon. Attorney-General's office, I beg leave to refer you to the same for any further information which may be needed.

"With respect to all the accidents that have happened, I have not discovered that any blame or negligence could be attached to any one. The workman is presumed to be skilful enough to know when there is danger in his working place, and to judge for himself when he is at work, subject to the directions of the overman or fireman.

"In view of the terrible calamity that has befallen this district during last year, it is incumbent upon every one of us, in the year on which we are entering, to be watchful, as we are surrounded by the elements of danger at all times, and I trust that the greatest care will be taken so as to prevent all accidents, even of the slightest kind, so that at the close of the year the chapter will be short and of no serious nature. I also hope that the year before us will be prosperous to the mining industry and the workman in common.

"Appended hereto are the annual colliery returns.

"I have, &c.,

(Signed) "ARCHIBALD DICK,

"*Government Inspector of Mines.*

"*To the Honourable*

"*The Minister of Mines.*"

COLLIERY RETURNS.

NANAIMO COLLIERY.

Output of coal for 12 months ending December 31st, 1887.		No. of tons sold for home consumption.		No. of tons sold for exportation.	No. of tons on hand 1st January, 1887.		No. of tons unsold, including coal in stock, Jan. 1st, 1888.	
Tons.	cwt.	Tons.	cwt.	Tons.	Tons.	cwt.	Tons.	cwt.
138,712	11	23,491	12	114,815	882	10	1,288	9

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
10	386	220	2	$2 to $3.50	$1 to $1.25	$2
Total hands employed..... 618				Miners' earnings, per day..... $3 to $4		

Name of Seams or Pits—South Field No. 2, South Field No. 3, and No. 1 Shaft.

Value of plant—$350,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—South Field No. 2, worked by slope, seam 6 to 10 feet; South Field No. 3, worked by shaft, seam 5 to 10 feet; No. 1 Shaft, worked by shaft, seam 5 to 12 feet.

Description and length of tramway, plant, &c.—Railway to South Field, 5 miles with sidings; railway to No. 1 Shaft, 1 mile with sidings; rails are of steel, 56 lbs. per yard of standard gauge, viz.: 4 ft. 8½ inches; 8 hauling and pumping engines; 10 steam pumps; 4 locomotives; 112 coal cars (6 tons), besides lumber and ballast cars; fitting shops for machinery repairs, with turning lathes, boring, drilling, screw-cutting machines, steam hammer, &c.; diamond boring machinery for exploratory work (bores to 2,000 feet); wharves, 770 feet frontage, at which ships of the largest size can load at all stages of the tide.

SAMUEL M. ROBINS,

Superintendent of the Vancouver Coal Mining and Land Co., Limited.

WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31st, 1887.		No. of tons sold for home consumption.		No. of tons sold for exportation.	No. of tons on hand 1st January, 1887.	No. of tons unsold, including coal in stock, Jan. 1st, 1888.
Tons.	cwt.	Tons.	cwt.	Tons.	Tons.	Tons.
239,217	4	72,464	4	187,193	20,711	271

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
None.	308	258 Employed by miners—149	None.	$2 to $3.75	$1 to $1.25	
Total hands employed..... 715				Miners' earnings, per day ..... $3 to $4.50		

Name of Seams or Pits—Wellington.

Value of plant—$250,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—Six to 10 feet thick; 3 shafts; 1 adit level; 3 air shafts.

Description and length of tramway, plant, &c.—10 miles of railway; 6 locomotives; 197 waggons; 10 stationary engines; 9 steam pumps; 4 wharves, for loading vessels, with bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of coal for 12 months ending December 31st, 1887.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1887.	No. of tons unsold, including coal in stock, Jan. 1st, 1888.
35,431 tons.	1,000	32,831	2,000	1,340

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
1	83	47	None.	$2 to $3	$1 to $1.25	
Total hands employed..... 130				Miners' earnings, per day..... $3 to $5		

Name of Seams or Pits--East Wellington, No. 1, Shaft and a Sinking Shaft.

Value of plant—$119,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—One seam 2½ to 6 feet; 4 levels; 2 shafts; 1 heading working.

Description and length of tramway, plant, &c.—Railroad, 3-foot narrow gauge, 4 miles; 2 locomotives; 20 4½-ton coal cars; 1 pair hoisting engines; 1 large donkey engine; 1 steam pile driver; 1 steam saw-mill complete, capacity, 12,000 feet per day.

EAST WELLINGTON COAL CO.

TOTALS OF THE ABOVE RETURNS.

Output.	Home Consumption.	Export.	On hand 1st January, 1887.	On hand 1st January, 1888.
413,360 tons.	96,955 *	334,839	23,593 *	2,899

Hands employed, 1,463.

* The East Wellington Colliery return is slightly inaccurate, and consequently these totals are only approximately correct.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer, at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1888,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1888,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer,
at the Government Printing Office, James' Bay.

loyed;

aft.	Tunnel.	Description of Machinery. Water Wheels.	Steam Engines	Value of Gold per ounce.	Est'mated va ue of yield for the year.	Total Divisions.	Total Districts.	rage arly nings man.
4	4	1	1	$16.00	$26,994			173
1	1	.....	.....	17.25	11,300			403
....	.....	.....	.....	16.00	3,000			506
....	.....	.....	1	17.00	2,300			634
....	.....	.....	.....	16.00	3,500			517
1	.....	1	.....	16.00	7,000			482
....	.....	.....	.....	16.50	5,500			849
3	.....	.....	.....	16 & 17	7,000			813
1	.....	.....	.....	16.00	2,300			893
....	.....	.....	.....	.....	7,000			814
						$75,294		992
4	2	.....	1	17.00	4,000			749
2	1	1	.....	17.00	3,[illegible]00			569
1	.....	.....	.....	17.25	10,500			734
								671
								567
								643
								1,222
								783
								820
								677
								607
								518
								551
								548
								404
								396
								246
								287
								296
								307

l claims.

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1888.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863				4,400	482
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
1885	594,782	,, 118,956	713,738	2,902	246
1886	753,043	,, 150,608	903,651	3,147	287
1887	578,924	,, 115,785	693,709	2,342*	296
1888	513,943	,, 102,788	616,731	2,007	307
			51,599,957		

* This is exclusive of over 650 white men who, during the season of 1887, were working on or prospecting for mineral claims.

REPORT

OF THE

MINISTER OF MINES,

1888

To His Honour HUGH NELSON,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1888, is herewith respectfully submitted.

JNO. ROBSON,
Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,
12th March, 1889.

REPORT.

GOLD.

The value of the Gold exported by the banks at Victoria during the year 1888, is as follows:—

Bank of British Columbia	$286,923
Bank of British North America	57,186
Garesche, Green & Co	169,834
	$513,943

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, November 20th, 1888.

"SIR,—I have the honour to submit, for the information of His Honour the Lieutenant-Governor in Council, my fourteenth annual report upon the mines and mining industry of the Cariboo District.

"As regards alluvial mining, there is but little of importance to note. A few of the old claims have paid fairly well, but many have not paid fair wages.

"There are, however, several of these claims that have been many years 'opening their ground,' which are now becoming profitable to their owners.

"It will be observed from the statistics that while the population has decreased, both as regards whites and Chinese, the total yield of gold has slightly increased; so that the product averages, per man employed, considerably in excess of that of last year.

"On Williams Creek and immediate tributaries there have been twelve claims operated as hydraulics (besides those worked by other methods) with more or less success; among the more fortunate of which may be mentioned the Jenny Lind, the Forest Rose, the Bradley-Nicholson, and the Black Jack Companies.

"The Conklin Gulch Company, who have spent some years in taking in a cut and laying flume, have this year met with such encouraging prospects that we may fairly hope that this claim will in future be among those classed as 'profitable to their owners.'

"On Antler and Cunningham Creeks there have been five or six hydraulic, besides other, claims in operation during the season.

"The Back Shing, a Chinese Company on Cunningham, find gold in paying quantities away three hundred feet up on the hill-side; diggings that with proper water facilities, it is believed, will pay twenty-five dollars per day to the hand.

"Whether this will lead to new ground of any extent is not known, but it is evidently cut off from the old bed, and no apparent source has been found so far.

"Mr. Alex. Sharp is bringing in a ditch some five hundred feet above the level of the stream to work this place.

"The Nason Company, Antler, which has for so many years battled with the hitherto unconquerable water, have this year been able to extend their researches underground, and though not yet on rich ground have got most encouraging prospects; round, heavy gold has been obtained at the rate of one and a half dollars to the bucket. Notwithstanding many obstacles they are still pushing on across the creek to find the main lead.

"The hydraulic claims on Mosquito Creek have turned out better than usual, with the prospects good for next season's work.

"On Lightning Creek Division there is but little to report.

"The output has been greater than that of last year, produced, principally, by desultory mining by Chinese. Harry Jones & Company, who have a lease on Peter's Creek (a tributary of Lightning), have not yet succeeded in finding clay on which to sink, although they have run a tunnel some 400 or 500 feet in search of it.

"In the Keithley and Harvey Creek Division, upon which Mr. Stephenson will report at length, I may mention Anderson and Smith's success in developing the old 'Live Yank' claim, the permanence of which as a paying claim is now assured.

"The Horsefly country has attracted considerable attention, but of the work there I am unable to give details. Mr. Harper has not met with the success anticipated, but Dan. McCullum & Company have opened a claim five miles below with fair prospects.

"I estimate the product of gold from this district (exclusive of Omineca) as follows:—

Barkerville	Division from 1st January to 20th November			$ 75,294
Lightning Creek	"	"	"	36,536
Quesnelle	"	"	"	56,547
Keithley & Harvey, approximately,	"	"	"	66,000
Desultory, of which accounts are not obtainable				7,000
Whole district, 20th November to 31st December				9,000
				$250,377

"*Quartz.*

"The quartz interest, from which we hope so much, has been stimulated by the fact that works are now being erected by the Government under the charge of Mr. E. A. Martin, whose report is herewith enclosed, and which will be read with satisfaction; many claims having been taken up with a view to getting them tested when the mill is ready, but not so much outside capital has been invested as this important enterprise seemed to justify, capitalists, presumably, reserving themselves until actual facts and results are before them and there is a feasible means of examining the mines for themselves.

"Several claims have quartz ready for the works, and this winter or early spring will probably tell us what some of our veins are worth.

"In this connection, if I may be allowed, I would suggest that a very moderate charge be made for the testing of ores, so that a fear of great expense will not deter prospectors from bringing quartz to the works. Quartz for test can be brought to the mill with advantage in winter, and, in fact, while the snow is on the ground it is the most feasible means of getting quartz from many localities to which there are no roads.

"The various mills will, doubtless, have their concentrations brought to undergo the process to ascertain the amount of gold the sulphurets contain, and how much free gold may be got by the agency of water alone; but while the re-agents employed for their reduction continue to be carried by freight teams over 300 miles of road the cost will be high, and possibly preclude the profitable working of low-grade ores, such as it is probable many of these reefs contain.

"*Railway.*

"The attention of miners and others has been considerably attracted to the prospects of the quartz reefs consequent upon the erection of the reduction works (and upon which a number of men have been and are still employed), as upon the success of this, and the development of the country by railway, the future of Cariboo in a great measure depends.

"I am pleased to observe that candidates at the elections now pending for the Commons and local House see the imperative necessity of a railway to Cariboo for the development of the country, especially the mines of this district, which, given cheaper supplies, machinery, etc., would undoubtedly furnish lucrative employment for thousands where at present but hundreds are employed, and who now make scarcely more than a fair living.

"A railway from the coast, or from some point on the C. P. R., running through the agricultural and mining portion of the district, and through the Yellow Head Pass of the Rocky Mountains, connecting with the railways of the North-west at Edmonton, offers exceptional advantages for the investment of capital.

"It may not be generally known that a practically level pass through the Cariboo Range north-east of Barkerville has been discovered, and a trail made through it to the waters of the upper Fraser last season. The discovery of this Pass, with the superior advantages possessed by the Yellow Head Pass through the Rocky Mountains over all others, would render the building and maintaining of a railway less expensive than that of any of the present transcontinental lines. Such a line of road would also open up some of the finest agricultural land of the North-west, viz: that between Tête Jaune Cache and Edmonton, to say nothing of the immense coal beds which are to be met with on the McLeod and Pembina Rivers. The writer speaks on this from personal observation, and from a long and intimate knowledge of the capabilities of this district as a mineral country. It is to him inexplicable that while colonization railways are building or projected in almost every direction from the C. P. R. in the North-west, that such an unequalled opportunity for the investment of capital should be allowed to pass.

"It is earnestly to be hoped that some initiatory steps will be taken by the Legislature this year, and that both local and Dominion Houses will work together for this much to be desired end.

"I have, &c.,
(Signed) "JNO. BOWRON,
"*Gold Commissioner.*

"*To the Hon. Jno. Robson,*
"*Minister of Mines.*"

MR. MARTIN'S REPORT.

"BARKERVILLE, B. C., November 20th, 1888.

"SIR,—I have the honour to submit, in response to your request for a report upon the progress, present condition and description of the Reduction Works, as follows:—

"Although some delay occurred in getting started, I regard the progress made under many adverse circumstances as exceedingly satisfactory. Our distance from railway communication I have found a great drawback to pushing the work, and in many ways taxes a person's inventive genius to the utmost to improvise and find a substitute for ever-recurring necessities not here obtainable, but this is invariably the experience of all pioneer establishments of the kind in other places.

"After my return from San Francisco, where I had been selecting machinery, a site was chosen for the Reduction Works on the waggon road, about two miles below Barkerville, where a force of men were at once put to clearing the ground and grading for a foundation.

"Some little difficulty was met with in finding suitable clay for making bricks, but this was finally obtained, of a good quality, about a mile from the mill-site, and at once a large force of men was put on clearing a place for a yard, and finally making and burning a kiln of about 80,000 bricks, which have proved to be of very good quality.

"A contract was let, by tender, to Mr. John Knott for the necessary buildings, which consist of a furnace building 75 feet long by 27 feet wide; a mill building 40 feet long by 22 feet wide; a pan room 30 feet long by 22 feet wide, and an engine room 40 feet long by 23 feet wide, all boarded, studded, and lined, which will make them good, strong, substantial buildings; the contract price being $4,700. The buildings are now nearly complete, the work being done satisfactorily.

"The machinery purchased in San Francisco consists of one Kendall stamp-mill, capacity five tons in twenty-four hours; one twenty-horse power engine and boiler; one five-foot improved pan; one six-foot settler; the necessary shafts and pulleys for the above, and door frames, bolts and buckstays for a fifty-foot reverberatory roaster, which has a capacity of three tons of concentrated sulphurets in twenty-four hours.

"The reverberatory roasting furnace is now well on to completion, and also the brick stack for the above. The boiler and engine have been set up, but the necessary connections are yet to be made. The pan and settler are in place, but the stamp has yet to be put up, all of which will be completed about the end of the present year.

"Good limestone was found here, and a sufficient quantity for our purpose was burned.

"I might say that in selecting the machinery and appliances for the works I was guided entirely by what I conceived to be the best of the known methods for the treatment of such

character of ore as is here found, and I have endeavoured to adopt the least expensive but nevertheless effective method, so that mine owners of limited means would not be deterred by a heavy outlay from opening out their mines.

"In conclusion, I must express my unbounded confidence in the future of this district as a mineral country; and although, from its remoteness, its development may be slow for a time, yet, with the production of bullion, confidence will be inspired, and development encouraged.

"I have, &c.,

"*John Bowron, Esq.,* (Signed) "E. A. MARTIN.

"*Gold Commissioner, &c., Cariboo.*"

Keithley Division.

REPORT OF MR. W. STEPHENSON.

"FORKS OF QUESNELLE, B. C., November 19th, 1888.

"SIR,—I have the honour to forward herewith the estimated yield of gold for the Keithley and Williams Lake Polling Divisions, District of Cariboo.

"The total yield is nearly the same as last year, although there appears to be a slight falling off; but it is very hard to get any reliable information from the Chinese as to the amount of gold they are taking out. Still, I think my estimate is nearly correct.

"We have had an exceptionally good season for mining, especially on the small creeks and gulches, as there was an abundant supply of water nearly up to the end of the mining season, which enabled those mining on small streams to work much longer than usual. Although on some of the large streams, such as Keithley and Snowshoe Creeks, work was somewhat retarded during the first part of the season, still, upon the whole, the season just ended must be called a good one, as the weather has been good nearly up to the present time, which is not often the case in this section.

"On Keithley Creek the white miners have not done quite as well as last year, but as they still have the winter ahead of them, which is the best time for working deep ground, they have yet the chance of pulling up for any falling off during the summer. On Snowshoe Creek the outlook is quite favourable. Messrs. Anderson & Smith have got their claim well opened up, and it has paid them well for the season's work, with the prospects of still better pay in the future, and plenty of ground to keep them going for the next ten years, while there is also the probability of several more good hydraulic claims being opened on Snowshoe Creek, as well as the quartz ledge owned by Messrs. Vieth & Borland, upon which they have been working during the summer, with results, I believe, satisfactory to themselves; and although there are plenty of quartz veins or ledges about the head of Snowshoe Creek, there has been no prospecting on any of them except on Messrs. Vieth & Borland's claim; but it is to be hoped that with the Government Test Works once in running order, other ledges in that vicinity will be prospected. On the North and South Forks of Quesnelle River there is very little change from last year, as the miners are all Chinese, and, except for a few claims, the mining is of a desultory character. On the South Fork there are two or three good claims, but, owing to the scarcity of water for hydraulic purposes, the yield of gold is not very large. With plenty of water, and properly worked, some of these claims would pay big dividends. As it is, the Celestials owning them seem to be perfectly satisfied, as they only work from two to three months in the year and keep ahead even at that, while down along the Main Quesnelle the Chinamen still work away during the summer season, going from place to place according to the stage of water. On Kangaroo Creek, which empties into the North Fork of Quesnelle River two miles above the Forks, a company has been at work for the last two years trying to sink a shaft. This last year another company located ground joining them and assisted, but they have not yet been able to get to the bottom. They are down over sixty feet. The ground is very difficult to sink in, being slum and quicksand, but when they suspended operations for the season the ground had improved in the last work they had done, and they think now they have got through the worst of it, and are in hopes that when they resume work in the spring they will soon reach the bottom. This creek has been a good creek on the surface, but has never been bottomed yet, and should the present companies succeed in getting down and finding a prospect it will create quite a stir in this place, as there is considerable ground of the same kind as that now being prospected.

"On the Horsefly River there is considerable prospecting going on, and will be, for the winter at least. So far, none of the companies have got into the channel, except the Discovery Company, whose claim, as they get it opened up, is always improving. The last work they did before the cold closed them out for the season promises well for next year. During this last season they ran a cut through the rim rock and are opening it up for an hydraulic claim, having a good water privilege from a lake that gives them plenty of water for the season.

"The other companies, just below the Discovery Company, are driving tunnels in to strike the same channel. These claims are five miles down the river from where the old diggings were, and where Mr. Harper is now, or rather was, working last summer, and although he has suspended operations for the present it is probable he will resume work again, as it is not likely that he will quit now after the enormous expense he has already been at, and it cannot be said that he has at all tested his ground, as he had only just commenced to wash when he had, unfortunately, to shut down. As things are in his works at present the expense of resuming operations would be light, and it is altogether probable that the work will pay if properly managed.

"I have, &c.,
(Signed) "W. STEPHENSON,
"*Government Agent.*

"*The Honourable*
"*The Minister of Mines.*"

CASSIAR.

MR. CRIMP'S REPORT.

"LAKETON, CASSIAR,
"16th October, 1888.

"SIR,—I have the honour herewith to transmit the mining statistics of the Cassiar District for the current year, and for your further information to submit the following report:—

"The accompanying statistics will be found to shew a decrease from last year, the reasons for which are, that the mines are gradually being worked out, and no new discoveries have been made during the past summer.

"On Dease Creek there were only seven white miners and twenty-seven Chinese working. Many of the Chinese did not record any claims, but worked from point to point in a desultory manner wherever they could make a few dollars. Most of them did not make enough to buy their winter provisions. The few white miners did not do much better. I know of only one company that paid over wages. One hill claim, I think, did very well, but the outlook of this creek for the future is not encouraging.

"On Thibert Creek there were ten white miners and eleven Chinamen working, and I think the white miners averaged about wages; two companies did very well; but as will be seen by the statistics the total amount shews a falling off from last year, and consequently does not offer much encouragement; in fact, the creek is about worked out.

"On McDame Creek there were only six white miners the past summer and forty-seven Chinese mining, and it appears from the information that I received, only one claim paid wages, that was on Quartz Creek, a tributary of McDame. This is a tunnel company, and returns from this company shew that they did very well and the outlook for the future of this claim is promising.

"The Chinese on this creek, from the returns which could be gathered from them, appear to have done little good, and I think from observation that they did very poorly; the majority of them were continually moving from place to place trying to scratch out a few dollars. Of course this creek has been worked for the past fourteen years, and it is a wonder that it has held out so well.

"There has not been any prospecting to speak of during the past summer. Nearly all the miners have been trying to make a few dollars to enable them to winter on. Six whites will winter on Dease Creek and about twenty-five Chinese; and on Thibert Creek, five whites and six Chinese; and on McDame Creek, seven whites and thirty five Chinese. Vegetables on this creek are abundant; the Chinese grew 12,000 lbs. of potatoes, with turnips and cabbage in abundance.

"Total amount of gold taken out of the district for the past mining season, as will be seen from the statistics, is as follows:—

Dease Creek	$13,600
Thibert Creek	6,725
McDame Creek and its tributaries	19,000
Desultory	4,000
Total	$43,325

"The above amount, I think, is a very accurate, and I think is rather under than over. On account of so many of the Chinese not working in companies, it was hard to find out exactly what they did take out.

"There is an abundance of provisions in the market, and consequently no lack of anything in the way of living for the coming winter. The past summer has been an exceptionally fine one; no summer frosts; the crops in the farming district have been very good, and all hardy vegetables have come to great perfection.

"I have, &c.,
(Signed) "J. L. CRIMP, G. C.

"*The Honourable John Robson,*
"*Minister of Mines, Victoria.*"

KOOTENAY.

Western Division.

MR. SPROAT'S REPORT.

"WEST KOOTENAY,
"FARWELL, B. C., 18th August, 1888.

"SIR,—I beg leave respectfully to offer to you some information about the mining camps in the southern sub-division of this district. The region not being well known, I will send a topographical description and map by and by

"*Toad Mountain Mines (Silver).*

"The common rock of the mountains in the neighbourhood is a grayish granite, graduating into, or alternating with, gneiss that often is strongly schistose. Here and there are greenstone dykes of considerable length, and varying from half a foot to seventy-five feet in width. Through these granite rocks there runs, with the formation, a band or belt of what the miners call 'limeshale,' which is, perhaps, properly a compact magnesian limestone (See Specimen No. 1), judging from its appearance below the surface. This belt has been prospected imperfectly for five or six miles in length. It is about a mile wide, but the exposures on stream beds and other indications show that it extends, irregularly, to a greater width. The direction of the belt is nearly due east and west. It lies, say 3,800 feet above Kootenay Lake, or 5,500 feet above sea level, high upon the steep northern slope of the southern mountain wall of the Kootenay Valley, which valley begins about Toad Mountain, in the angle formed by the Kootenay River as it emerges from the lake, and by Cottonwood Creek. The eastern end of the 'camp' (American term for any separate mining district) is about six miles up the steep mountain slopes, from the head of the west arm of Kootenay Lake. Coming down the west arm from the lake, Toad Mountain towers almost in front of you as you approach. The above belt, in its course westward, crosses several high ridges that jut from the slope northerly towards the Kootenay River. Small streams descend from the summit of the range between these ridges, of course crossing the belt. The country is rough, but without any features of savage grandeur such as are visible all around in looking from the summits. A couple of easily ascended peaks show rocky scalps, but, with that exception, the surface is densely wooded,—chiefly with balsams and some spruce,—and there are several feet of soil, up to and upon the highest claims in the camp. About one thousand feet lower down the northern slope

tamarac, cedar, white pine, &c., prevail. The trees along the lake and river have been destroyed by fire. There is a heavy snowfall in winter, and broken weather, of course, in spring and fall. The snow had all gone this year, even from the peaks mentioned, by the middle of June. The seasons vary much, but, probably, from July to October, inclusive, may be considered 'prospecting' months in that high region; in the lower country, three months longer. Good mill-sites abound. Apart from the distance, the contour of the surface between the camp and the lake is not unfavourable for air tramways. A railway up Cottonwood Creek, with stiffish grades in part, might come within two and a half miles of the camp.

"It is in the above belt of country rock that the silver-bearing lodes occur, but they are not limited to it, as good ore has been found several miles away in different directions. The structure of the two first discovered claims in the camp (Messrs. Hall's) has not yet been determined. Outside of these—which may be ore masses, or may turn to lodes—I should say that the lodes vary from about six feet up to, and in a few cases, fifteen feet in width—large sizes for high grade ores. The ore chutes, in general, seem to be at right angles to the course of the lead, which, I fancy, is not very common.

"The gangue, or lode-material enclosing the ore, seems to consist of the country rock in part; also calcspar, a whitish quartz and limonite. In the two first discovered claims above mentioned, the gangue is, for the most part, the country rock more or less mineralized, and harder than the rock outside (See Specimen No. 2). Quartz gangue seems to be commoner towards the west end of the camp.

"The grey copper and lead ores—the tetrahedrite and galenite—are the principal silver bearing ores of the camp (See Specimen No. 3 and No. 2 above). The grey copper—steel-grey to blackish—is well distributed in varying quantities. There is not much galena in the camp as a whole, but nearly all the claims carry a little, and some a good deal, say twenty-five per cent. The galena is the coarse, cubic, eminently silver-bearing ore of this country. A somewhat large quantity of copper pyrites, with a less quantity of iron pyrites, is common in the claims; indeed, it may be said that there is copper everywhere. The only smelting return that I possess shows seventeen per cent. The variegation produced by the coating here and there of blue and green carbonate of copper and cobalt bloom suggests the fancy that the ores blush on being torn from their secret bed. Gold is present in some of these silver claims, and, in two or three, in not inconsiderable quantities. It is too early to know what the silver is combined with. Antimony has been observed, and indications of bismuth. Zinc, so far, is not known to be present. The limonite of the gangue is highly manganiferous. In a specimen or two, stated to be from this camp, I noticed small globules of native silver, and was told, on not very competent authority, that something very like ruby silver had been seen in another specimen. Some carbonate stuff was found in a galena claim just as I was leaving, the nature of which had not been determined. The size of my district subjects me to the illfortune of having to leave mining scenes often at interesting times. The presence of carbonates is important in a camp, as, usually, they are rich, and their earthy or sandy character makes it easy to mine them, and to ship and treat them. The ore that has acquired, distinctively, the name of carbonate is, I understand, a mixture of silver chloride with more or less of lead carbonate, often with iron oxide (from the decomposition of iron or copper sulphides), and with limestone and other material from the decomposed rocks. The bearing of this remark is that one of the camps in this district, to be hereafter described, promises to be a good carbonate camp, and carbonates are found in all of them.

"I annex a diagram of the located claims, which, of course, is only approximately correct; but it will show you that nearly all the ground is taken up along the belt for four or five miles. The records, in and near the Toad Mountain Camp (including ten claims on the gold belt to be hereafter mentioned), numbered 228 on the first of this month. There were about 75 men in the camp at that date. Most of these men represented absentees as well as themselves. On Hall's discovery of the camp, last year, being bruited abroad, many claims were speculatively located, some on deep snow—a proceeding of doubtful legality. This has driven many good prospectors from the camp, who did not care to work on staked ground. It tends to confirm my dislike of the extension to six months of the former period of three months, allowed for the $100 expenditure. I am aware of what may be said in favour of the period of six months, but the effect of the extension is not always what was hoped it would be. A fair number of monied men, seeking investment, have visited the camp already, notwithstanding the imperfect communications, but there have been no sales. The glamour of the good first discoveries affects every man who holds a five-foot prospect hole. In some cases the local man was willing to sell, and the outside partner unwilling—the former better realizing, probably, that a 'pros-

pect' is not a mine, and never may be a mine. The real nature of a 'prospect' can only be known, in most cases, by a comparatively large expenditure following the purchase of the claim; and this is the risk of the buyer, who may, and often does, lose both the purchase money and the expenditure. However, I suppose, so long as mines are mines, some men will frighten away capitalists, and, in their cabins, repeat the formula, 'What we want, sir, is capital.'

"As the camp now is, it is difficult for anyone to estimate its probable value. The first requirement for such an estimate does not exist, namely, a geological examination, showing the true character of the lodes and their ores, the metamorphism, the connection, if any, with eruptive rocks, and the various regional, or local, conditions which assimilate the camp to, or differentiate it from, other silver camps that have succeeded. The opinion of experienced mining men—practical and scientific—decidedly is, that the camp is one of great promise, as far as this can be said of a surface showing. Very little work has been done as yet, but the ores improve, as a rule, with depth, both in quantity and quality.

"The assays from different claims show that the ore of which the grey copper forms a large proportion yields from 50 oz. to several hundred ounces per ton—in some cases very much higher—and the galena ores from 40 oz. up to 100 oz. per ton. Some of the claims will be much helped by the gold that is in them. It is a high grade camp, though several claims, unless they improve when sunk into, must be classed as low grade, owing to too much gangue, needing concentration of the ores before shipment.

"But the assays of specimens and small lots are chiefly useful to the prospector; the milling test of a large quantity of ore is the true test. So far I can mention but one—a return of 220 oz. of silver, gross, to the ton, and 17 per cent. copper, from a two-ton lot of sorted ores sent from a claim in which the gangue is, as I have said, chiefly mineralized country rock, with little quartz and galena. But other milling returns will be available by and by, as shipments of four to five tons a week from the same claim are being made. I here give a month's account by the local assayer of this claim, of his assays of ores now being shipped, or awaiting shipment:—

"1888		oz.	oz.	oz.	oz.	oz.	oz		oz.
"June 3rd—5 assays—		354;	345;	933;	364;	1890		Total,	3895
"July 5th—4	"	704;	622;	182;	182			"	1690
" " 27th—6	"	38;	573;	161.57;	1740;	126;	373	"	3011.60
" " 27th—4	"	155;	218;	38;	68			"	479
"Aug. 1st—3	"	349;	48;	124				"	511
" " 5th—5	"	97;	97;	1869;	38;	583		"	2484
									12070.60

"27 assays, average 447.06 oz.

"As regards the quantity of ores—here, again, caution is necessary, in speaking of a camp with only, at present, a surface showing. The deepest shaft is not over 75 feet, and most of the shafts, inclines and tunnels are much under that depth or length. But there is no change in the country rock so far, and there is, as already said, a general improvement, both in quantity and quality of the ores, with depth. It is considered that, were the camp developed,—which will require minerlike management, great energy, and large capital, there will be ample supplies of high grade ore for a permanent camp. The fact of the existence of continuous lodes has not been fully proved to my mind, but very nearly so. The present season is just opening. Much of the ground is shut to prospecting, for the reason already stated. The prevailing belief, which there is much to confirm, is that the first discovered two claims at the east end of the camp, supposed to be extensive and rich, are there, so to speak, like the knobby handle of a pair of tongs; and that two lodes, like the legs of the tongs, about 1,000 feet apart, run westerly for four or five miles. East from the knob, so far, small indications only have been found; but towards the west end of the camp very good 'prospects' exist, for several of which considerable sums have been offered, lately. In much of the intermediate space ore bodies between walls (possibly parts of lodes) have been discovered, and also finds and indications all over that space, which most men in the camp consider show continuity of the two main lodes above mentioned.

"*Toad Mountain Mines (Gold).*

"The discovery, lately, of gold ore near the silver camp, is notable, and may be important. I cannot say much on this matter, as the discoveries were only attracting attention about the time I left.

"The so-called gold belt runs generally parallel with the silver belt easterly and westerly, but is about a mile and a half lower down the northern slope of the range, that is to say, between the silver belt and the Kootenay. The two belts tend to converge as they go westward. The country rock of the gold belt is said to be composed of a subcrystalline, slaty rock, perhaps chloritic, except at the west end, where the veins lie between greenstone on the one side, and grey, compact, fine grained granite on the other. The course of the belt at the west end, is northerly and southerly, and the dip of the veins is with it, whereas, elsewhere, the course and the dip of the gold belt are as in the silver belt. The gold rock in general lies almost in contact with the lime rocks in which the silver is found. The gangue in the gold veins is composed chiefly of clean quartz, white to chocolate in colour. The west to south wall, generally, is impregnated with copper pyrites; in some cases these are in the vein.

"There are several very promising claims, banded veins, for the most part, at the west end of the belt, from 3 feet in width down to very small, but all rich in free milling ore. One is uncovered for 700 feet, with an average width of 18 inches, and a range of assays from $40 to $1,400 a ton. The holders, probably, will have a mill running there before winter.

"Towards the eastern end of the belt, about a mile back from Cottonwood Creek, between that creek and Messrs. Hall's claims (on the silver belt), is a kind of golden conundrum, a mass of fragile ore matter, about 300 feet across and 5 to 12 feet in depth, in colour yellowish, lying on the wooded hillside, without definite shape or boundaries. Some think that the hanging wall has been displaced; others regard the mass as a kind of 'spew-out,' which may have a vein or chimney beneath it. The ore is free milling, and prospects nicely, $7 to $25 per ton of ore taken from a narrow cross cut made by the holders. The ore looks similar throughout the mass. If this prove to be so the claim may become important; there is a good site for a gold mill beside it and also water power. In an adjoining claim, one wall of a 5 or 6 feet vein has been found with ore that looks well.

"Several locations have been made both east and west of the above, but no work has been done on them yet. There is a string of rather promising claims about three miles to the westward, probably having more gold bearing sulphurets, with some very rich ore; but it is too early to express any definite opinions about these or other locations on the gold belt until more work is done. The claims are in good hands, and it is quite possible that the gold belt will be a valuable addition to the wealth of the Toad Mountain camp. It is traceable for the whole distance with breaks, by the presence, on the surface, of peculiar reddish and yellowish rock matter of a shaly structure.

"The long winter, with heavy snowfall, and the disagreeable spring in the Toad Mountain silver camp, together with the dense covering of trees and soil on the surface, will tend to discourage prospecting—(many prospectors this year, after consuming their supplies, and exhausting their stock of uncomplimentary epithets, made rapid tracks rearward)—but the camp and its contents are there, and will be there, and adverse climate or topographical conditions are not much regarded in underground workings that pay. The country is rough and steep, and probably a large expenditure will be necessary to put mines there in good shape for permanent working on a large scale, including the transport of ores to the water The ore that is now being shipped is sent by a six mile trail on pack horses to the steamboat landing on Kootenay Lake, near the mouth of Cottonwood Creek.

"*Hot Springs Camp (Silver).*

"Leaving the Toad Mountain camp with the conviction that there is a splendid 'jewel' in the 'ugly head' of it, and not unuseful purposes, perhaps, in the adverse natural conditions that may affect its rapid development, a six miles tramp down the forest trail which, for the most part, follows a rushing tributary of Cottonwood Creek, brought me to the mouth of the latter, whence I started in a boat for Hot Springs camp on the west side of the main Kootenay Lake—a camp which, to the people of the Province has been, hitherto, at the 'back of beyont,' for anything they have known of it. The trip is twenty miles up the west arm, and then eight miles northward on the main lake. The granite of the mountains graduated as we left the west arm into mica schist along the west shore, backed by, and in some places, intermixed with yellowish limestone on the rough slopes, which proved to be a softer limestone than that at Toad Mountain.

"The Hot Springs camp embraces an area of about five miles by three, lying between Coffee and Woodberry Creeks, on the west side of Kootenay Lake, opposite the old galena deposit discovered in 1825 by the botanist Douglas, and known as the scene of the Sproule-

Hammil tragedy, which latter camp will be mentioned in its turn. Two creeks run through the camp, in addition to Coffee and Woodberry Creeks, and there is plenty of wood at the camp for mining purposes. The country is very rough; the hills rise abruptly, and I cannot say much in favour of the landings, either at Hot Springs or Woodberry Creek. The latter is the better of the two, but the ascent from it, for 600 feet, is very steep. The scenery is charming and the climate, of course, much better than in the elevated region of Toad Mountain.

"The country rock extends northerly, but with a slight westerly trend beyond Woodberry Creek, to a distance not determined.

"There seem to be, within the above area of five miles by three, with breaks and deviations, three tiers of claims with a general northerly direction parallel to the lake. The lower tier, say 800 feet above the lake, is, for the most part, in the schistose rock. The second tier, 500 to 700 feet higher up, is, in part, in the schistose rock, and in part in the limestone—the line of contact of these formations here being somewhat irregular and thrown out by a dyke of perphoritic rock that runs northward. The upper or westerly tier of claims, some of which are nearly 2,000 feet above the lake, is mostly in a contact of lime and schist.

"In mentioning 'tiers' of claims, a word of explanation is necessary, not, of course, for mining men, because they know what the nature of the country rock indicates. There are not here tiers of true lodes throughout. We do not look for these in the softer kinds of limestone. This rock is easily eroded by acid solutions and vapours. These solvents, filling cracks and fissures, eat out passage-ways, pockets, cavities, chambers—call them what you will—more or less according to the strength of the acid and the texture of the rock. The ore, as in the lead regions of Wisconsin, Illinois, the north of England, and, I think, in one part of the Hot Springs camp, occupies these caves and openings, instead of lying in true lodes—possibly, in some cases, having been held in solution by the same waters that made the caves, though certain minerals in the deposit may be of later origin. 'Pockety,' I fear, says the adverse critic; 'True,' replies Nature, 'what did you expect?' The real question, in such mining ground, is, as to the sizes of the cavities, and whether they are filled through all their ramifications, or only partly filled with ores. This question can only be answered by the proof of workings, but it is considered by many experienced men that the character of the rock, the nature of the associated minerals, their extensive distribution, together with experience as far as it goes, all point to the existence of a fair proportion of large, well-filled chambers in the limestone section of this camp.

"For the above reason, it may be said that the contact and lime formation claims here probably contain considerable ore deposits in cavities, untraceable one into the other, but, nevertheless, in their kind, occupying the portion of the 'tiers,' which would have carried true lodes had the country rock been harder.

"Those claims in the tiers that are in the schistose formation, appear to many eyes as lodes proper, so far as can be judged from a surface showing, on rugged slopes, with displacements.

"This camp presents obvious differences from the camp at Toad Mountain. The Toad Mountain camp is a high grade tetrahedrite silver-bearing camp, with comparatively little galena and some gold. The Hot Springs Camp is a galenite camp with an abundance of carbonate ores and very little copper, but more iron. The surface at the latter is less covered with vegetation and soil, so that the traveller sees the croppings more easily. What strikes one is the small amount of actual work done, the large amount of ore in sight, and the comparatively large piles of ore for the little amount of work performed in each individual working. The camp hitherto has been classed, absolutely, as a low grade camp, and much of it unquestionably is so, for instance, the lower and some of the second tier of claims, but the tendency of the ores to improve in value with depth (though little depth has been reached) and to turn into carbonates on the upper claims, especially near the contact, which two notable facts appear this summer, point to a possible average value that would remove the camp, as a whole, from the low grade class. Such a description is inapplicable to a camp which, in so many parts, if not continuously, shows large bodies of fair grade ores with sixty to seventy per cent. of lead and thirty up to even one hundred ounces of silver per ton—the ores having a strong tendency to turn into carbonates of varying value, but some very good. Carbonate ore has been found in over a dozen claims, and in some of them in not inconsiderable quantities. Red carbonates extending several feet in every direction, and requiring only a pick and shovel, have appeared in a claim towards the north end of the camp since I left. These assay from sixty ounces to to 190 ounces of silver to the ton—of course an exceptional yield. From thirty to forty-five ounces may be about the average for carbonates in the camp with some of lower grade.

Eventually this promises to be a carbonate camp—possibly one of the best on the continent. From all that I can learn the ores are richer than those of Cœur d'Alene; some carry three or four times more silver. I have a little sample of the clusters of wire silver that appear in one of the chambers of a contact claim of high grade carbonate and galena, with an abundance of rich sulphides and sulphides. This is in a 'chimney' eight feet wide, not far from a larger 'chimney,' yielding moderate grade galena and carbonate. A few hundredweights of selected ore from this claim, taken with great labour to the shore, averaged 289 ounces silver to the ton. The quantity of galena and carbonate ores in this camp probably is very large. Conversation with men from Cœur d'Alene inclines me to record their impression, almost their opinion, that the production of this camp alone might equal that of Cœur d'Alene, towards which now the Northern Pacific Railroad Company and the Oregon Navigation Company are making opposition railways side by side. What then has kept this camp back? Well I suppose the answer must be—the prevalent belief in its low grade character, the deadening effect of American hostile tariffs, its isolation, the absence of proper Government officers, the embarrassment or, at least, uncertainty produced practically by some past legislation. I have said that little work has been done in the camp, considering its age, yet nobody who knows its history will feel anything but gratitude to those who, hanging on by their eyelids, have occupied the ground in the general interest of the Province and, I sincerely hope, ultimately in their own.

"The Hendryx Camp (Silver).

"The lake at the Hot Springs is two miles wide. Crossing obliquely, three miles take one to a small peninsular limestone remnant of submerged land with a quartzite band on its low, bold front that again appears at a point (Cape Horn) ten miles south, and an iron lode dipping into the lake—the whole backed by granitic mountains. If the Hot Springs camp, sometimes, is called the 'old camp,' this camp should be called the 'ancient camp,' for, as already said, it dates from 1825. Its chequered modern history, mixed with tragic incident, need not be related. Known, always, as a very large showing of silver-bearing galena ore, easy of access, and convenient to work, claims here have been located and re-located, examined by different experts, condemned for the most part, or damned with faint praise, as yielding ores of too low grade for handling at a profit. The contrary is not yet proved, but an American company, managed by a gentleman whose energy and courtesy brighten these solitudes, have backed their belief in the mine by an expenditure of $100,000 in one way or another in connection with its development. I found sixteen men at work there, a tramway finished and wharf in progress, and a strong tram-horse, unconscious of approaching labour, cooled his heels on the shore of the cove near which stands the cottage of the unhappy Sproule—the only stone house in Kootenay. The company's burly steamboat appeared every week, shrieking for cargo, and keeping up needed communication between Bonner's Ferry and the several camps. Several tunnels last year were run into bodies of carbonate ore, and an incline of eighty feet sunk entirely in galena, on the Blue Bell claim, the croppings of which extend for about 400 feet, thus proving the existence of a great body of ore. For further proof, a tunnel was run in—I forget how much lower down—for 195 feet, and the lode was struck just before my visit, wherein appeared a body of galena and carbonate ore of an extent not often seen anywhere. With this enlarged showing came a marked improvement in the quality of the ores—an improvement of such a character that the company have made arrangements to ship eastward 400 to 500 tons this season. They estimate that they have not far short of half a million tons of ore of various grades in sight.

"The three 'camps' above described are the only prospected camps in this southern subdivision of the district, but they probably form a small proportion of its mineral wealth. Good 'float' has been found towards the head of Kootenay Lake, and it is known that there are extensive galena deposits back from its northwest shore, and on the summit of the divide between Kootenay and Slocan Lakes,—locations too remote for present working. The valleys of the Lardo, northwesterly from the head of Kootenay Lake, and of Duncan River, which heads up towards the mountains south of Rogers' Pass, probably contain mineral-bearing formations, which are prolonged to and far north beyond Illecillewaet.

"The number of claims recorded on Kootenay Lake to the 1st of August was fifty-two.

"I will not burden this description of the camps with matters that may, more fitly, be mentioned separately or later in the season, but there are two vital points that demand notice.

"I have to repeat the statement, made in my exploratory report to you in 1883, namely, that without a railway from Kootenay Lake to Kootenay Mouth or from Kootenay Lake

to the C. P. R., the whole of this vast and minerally rich subdivision of the district is, and and will remain, useless to the Province. Trails are useful to the prospector or visitor, but a complete system of trails, and even waggon roads, would not bring the ores westward, or enable us to get more than a fraction of the general trade.

"While these camps remain undeveloped, or use a southern outlet, the Canadian Pacific Railway Company, which has done so much to develop our mines by giving reasonable ore freights, will be without the freight of several hundred tons of ore a day which otherwise would swell their traffic in the near future.

"Again, we must recognize that the tendency of American opinion, if not legislation, is to put prohibitory duties on our lead ores. The owners of American smelters need our ores in their business, but the lead mine owners, who have much influence in Congress, wish to exclude them. It is the competitive production of this undeveloped district which I have been describing that they fear, knowing the extent and value of it, apparently, better than we do. The remedy is for us to find markets independently; to improve and cheapen communications; to foster the growth of works and appliances to treat ores, and to seek strenuously emancipation from the effects of the custom-house legislation on the part of our neighbours.

"It would be foolish to overlook the many difficulties in the way of developing these camps, but equally foolish to forget that even greater difficulties have been successfully surmounted elsewhere, as, doubtless, they will be here. I estimate that there are about 250 miners in the subdivision—chiefly Americans. They form a sensible, well-behaved community. Messrs. Hall, Topping, Cobaugh and Henderson, at Toad Mountain; Messrs. Hendryx, Wheeler and Duncan, at the lake, gave me much information. Were I to acknowledge courteous attentions I must mention everybody.

"I have, &c.,
(Signed) "G. M. SPROAT,
"*Gold Commissioner.*

"*To the Hon. Provincial Secretary,*
"*Victoria.*"

"WEST KOOTENAY DISTRICT,
"FARWELL, B. C., 21st December, 1888.

"SIR,—My previous reports, and the one made this year about the Kootenay Lake subdivision, having described the general nature of this mining district, which is now pretty well understood, it is only necessary for me to state leading particulars respecting the different established camps.

"But before doing so it may be as well to repeat that this is a gold as well as a silver mining district, and distinctively a quartz rather than a placer district, though containing good placer grounds. It is noteworthy, also, that West Kootenay is ahead of all other districts for quantity of silver ore successfully marketed, and far ahead when quality, as well as quantity, is considered. So far as I can learn of mining results generally elsewhere in the Province, the district, probably, will keep this lead, and go comparatively still farther ahead.

"We already, when nothing beyond 'prospecting' work on mineral claims has been undertaken, have marketed about 600 tons of silver ore—most of it in galenite, of which total about 60 tons have returned over 300 ounces; 100 tons, from 110 to 150 ounces; and 440 tons, 60 to 70 ounces, silver, per ton. The close of the season, and want of means of transport, alone prevented more of the higher grades from being marketed.

"The time is not far distant when I shall have to report to you a product of 500 tons a day of silver ores from this district, with a fair proportion of ores of high grade.

"In all probability, also, the gold yield will much increase soon. Gold quartz prospects have been found during the past summer in different parts. Work continues on our placer grounds. Gold occurs in fair proportion in some of our silver claims. There will be two gold-testing mills at work in the district in spring. Promising indications exist of the presence of iron in large quantities.

"Such being the facts, in an almost unprospected district, it is singular that the public appear to know so little about them. I have lately read articles in some of our newspapers, written evidently without any knowledge that this district alone has successfully marketed 600 tons of silver ores. If our own mining business is not known to ourselves, how can we expect it to be known beyond the Province?

"Quartz miners, as a rule, are not so migratory as placer miners; still, they are migratory. Nothing strikes me more in the history of mining camps than the need of 'keeping things going' when once a start has been made. Hundreds of mining fields and 'camps' across the southern boundary advertise their attractions persistently, and with these a promising part of this district has to compete, both for men and capital. There is unquestionably, for whatever reason, a prejudice against mining in British Columbia on the part of American and other foreign capitalists. The most trustworthy descriptions of 'prospects' and the highest assays are regarded in many quarters, if not with doubt, at least with indifference. It is for this reason that I regard with satisfaction the actual large 'shipments' above mentioned. They arrest attention at once, and the questions immediately follow, 'Where is this from? Is there more of this stuff?' This is the stage reached now in this district, and it is vital to do all that may be properly done to 'keep things going' to disarm unfounded prejudice, to foster means of transport, revise our mining laws and regulations, if revision is needed, and smooth administrative action in every possible way.

"Our mining population in this division is about 500, and capital invested in mining about half a million dollars.

"The product this year is about $10,000 gold, and $75,000 silver, but these figures promise to be largely increased soon.

"I know, certainly, that companies and men, with at least ten times the above amount of capital, are seeking mining investments, and regard this district very favourably, so far as their information and inspections extend. There is every probability of my being able to report, next year, a great advance, particularly in the southern or Kootenay Lake sub-division, provided there is no hostile American legislation to retard progress. Of this, as mentioned in my last report, there is some danger, which makes it the more necessary to look ahead and provide means of reaching other markets with certain classes of our ores.

"American mine owners are moving Congress to impose a duty of two cents a pound to check the depreciation of lead, caused, as they allege, by Mexican and British Columbian importations, though our Province has not, as yet, exported much. This was the old rate of duty on lead ores imported into the United States. But by a new late ruling or interpretation of the law, lead, when silver-bearing, must be admitted free, unless the lead value exceeds the value of the silver and other combined metals. The ore, otherwise, is to be regarded as silver ore, which is free—for instance, a carload of Mexican ore producing, say, at Denver, $29 in lead, and $30 in silver, per ton, goes in free as silver ore. It is alleged that shippers manipulate the ores to bring the average up to a duty-saving point. The tariff policy of the United States, with respect to lead, will no doubt affect importantly certain classes of our ores until we perfect our communications and establish suitable works for treating such ores. I can only repeat here that it is essential that a railway be made immediately to connect Kootenay Lake and the Columbia River. A waggon road will not suffice. Twenty dollars a ton would probably be the minimum waggon road freight, without steamer freight up the Columbia. A railway would enable ore to be brought from Nelson to the C. P. R. here for $5 a ton, and perhaps less.

"*Big Bend, or Northern Subdivision of the District.*

"The placer camps in this Subdivision, on French Creek, McCulloch and Smith Creeks, continue to attract attention. The Glover Company on French Creek did well, and propose to bring water, in spring, from a considerable distance. The Lukes Company have done little on their leased ground, but I have not heard that they mean to abandon it. On McCulloch Creek, the Ophir Bed-Rock Flume Co. worked actively and with good results until their hose burst, too late in the season for repair. They will renew work early in spring. Near Smith Creek Messrs. Wallace, Norleans and others are wintering, and preparing a long flume to bring water upon some good ground there, where one of the party took out $500 in six weeks last summer.

"A party of five, Messrs Green, Dick and others, left Farwell 24th December, 1888, to work leased ground on McCulloch Creek. About $1,000 have been got this season on bars in the Columbia, which the low water enabled men to work. Half a dozen men are prospecting on Carnes Creek, and will winter there. Being, debateably, on the edge of the railway belt, individual miners choose other ground for prospecting work.

"Hardly any prospecting for mineral claims has been done in the Northern Subdivision during the past season, as a good many of the miners were drawn off to the southward, but confidence remains that some of the numerous quartz veins, known to exist there, are auriferous, and these will probably be examined next summer. I am still of opinion that our richest gold field may be in that quarter.

"I have reported to the Land Office that the land applied for by Messrs. Chase and others covers the Smith Creek Placer Camp, and that the land, or most of it, at Carnes Creek, which Messrs. Gray and McCallum propose to apply to the Legislature for, is within the railway belt, and is not unworked and abandoned.

"Owing to the proved physical obstacles in the way of individual miners in many parts of this Northern Subdivision, I am in favour of giving reasonable leases of moderate areas of mining ground, in order to encourage the introduction of capital, and accordingly have promised leases to the Wallace Company, near Smith Creek, and to the Glover Company at French Creek, on suitable conditions.

"*Illecillewaet, or Middle Subdivision of the District.*

"This established camp maintains its position, though the differences between the Dominion and the Province, as to the ownership of the minerals, restrict prospecting and investment.

"The operations, this season, of the Selkirk Mining and Smelting Co. (Limited), so far as regards development, have been confined entirely to the 'Lanark' claim. An incline shaft, 100 feet deep, has been sunk on the vein. About 500 feet of tunnels have been run in to tap the vein on the 100 and 400-foot levels, and some 300 feet of drifts have been driven on the vein.

"At present work is being pushed on the tunnel on the 400-foot level, which it is expected will cut the ore body during the winter.

"The 100-foot level is thoroughly developed by drifts, and shows about 10,000 or 11,000 tons of fine galena and carbonate ores in sight. About 1,000 tons are on the dump.

"The total quantity of ore shipped in 1887 and 1888 to the San Francisco Smelter is 422 tons. This was taken out of the exploring drifts, leaving the ore body intact. On the surface the black galena averages about 60 ounces of silver to the ton, while on the 100-foot level it runs about 120 ounces. The ore gets better, appreciably, with depth.

"It is expected that by the opening of next season developments made by the tunnel on the 400-foot level will be so satisfactory that a concentrating plant and aerial tramway will be erected. The mine will then be equipped in a manner that will enable it to take rank as a large ore producer.

"Messrs. Corbin & Co. have done a good deal of useful work, at a cost of probably $5,000, during the past summer. The lode which they are testing runs from 3 up to 8 feet in width. On this three tunnels, respectively 100, 72 and 40 feet long, have been driven, and all show the rock to be well mineralized. About 600 tons of ore are on the dump. The results, I believe, are considered to justify the erection of machinery and active development of the claim. The company, probably, will proceed vigorously as soon as the North Fork road is finished.

"The Edmunds Co. have run a tunnel for several hundred feet to test one of their claims, which has a good surface showing, but at the time of writing I have not heard whether they have struck the ore body.

"An interesting fact in connection with this Illecillewaet or Middle Subdivision of the district is the discovery of a very good silver-bearing galena prospect on Fish Creek, which rises a little south of the C. P. R. track, near the Glacier Station, and flows into the N. E. arm of Upper Arrow Lake, and upon that arm similar prospects of an encouraging character have been located. This shows that the mineral section in the Middle Subdivision extends beyond what may be called Illecillewaet proper, that is the camp near the C. P. R. Station.

"The Lardo country has not been actively prospected during the past season, but I have seen some $4 free milling gold quartz, brought by trustworthy miners, from the surface of a prospect discovered there. They will renew prospecting there in spring, and the Arrow Lakes, I hope, also will be more closely examined.

"I have, &c.,

(Signed) "G. M. SPROAT,

"*Gold Commissioner.*

"*The Honourable*

"*The Minister of Mines*

SOUTHERN SUBDIVISION.

"WEST KOOTENAY DISTRICT,
"FARWELL, B. C., 11th January, 1889.

"*Toad Mountain, Hot Springs and Hendryx Camps.*

"I described these camps in my special report thereon last summer, and now beg to annex extracts from letters lately received, giving some interesting facts:—

"HOT SPRINGS CAMP, 30th December, 1888.

"Things are looking very well here.

"Little Donald extracting ore all the time and developing a fine vein running north towards the Black Diamond. Some of the ore is rich, 100 to 300 ounces, and one assay went up to 1,700.

"No. 1 is being developed by a tunnel started three weeks ago on the 100-foot level, and expected to be 300 feet long before it reaches the lead—working three eight-hour shifts in the tunnel, and next week begin one or two shifts in the upper incline, following up a very good body of carbonate ore assaying 80 to 400 ounces silver—will spend $7,000 during winter.

"Gallagher is working five men, and are down sixty feet, finding 150 ounces ore.

"Krao working two men; No. 1, twelve men; Little Donald, six men; Spokane, one man; Now Then, two men; Blue Bell, eight men, and several others prospecting different veins.

"Toad Mountain:—Hall, eight men, and fifty tons selected ore on dump, etc. A good deal of ore will be ready as soon as navigation opens.

"Here, the Little Donald, say 200 tons; Gallagher, probably nearly as much; No. 1, I hope more.

"Hendryx is now drifting across a lode of fifty feet of solid galena, and no hanging wall yet.

"A Portland steamboat-man intends to begin a 150-ton steamer, capable of making the round trip, Bonner's Ferry to Nelson and Hot Springs, in one day.

"A man has been in to look for a site for a saw-mill, and writes me that his machinery will come down the Kootenay on the first boat in the spring."

"NELSON, 15th January, 1889.

"It will be matter of regret if Hall's great mine is affected by a law-suit, but the camp does not depend on one company's claims, however valuable.

"Dr. LeBean's prospect is a fine one. He received to-day an assay showing 5,018 ozs. to the ton, silver, and he does not yet know the mine's width. This is an exceptionally high assay, but his average is high enough to assure shipping ore.

"Tom Morrow brought down a sack of rich ore yesterday from the "Tough Nut," and says he has it four feet wide; if so, the mine is little inferior to Hall's. All those working this winter underground give good accounts."

"I have, &c.,
(Signed) "G. M. SPROAT,
"*Gold Commissioner.*

"*To the Hon. Provincial Secretary,*
"*Victoria.*"

Eastern Division.

MR. VOWELL'S REPORT.

"DONALD, B. C., December 31st, 1888.

"SIR,—I have the honour to forward herewith, for your information, the mining statistics for the year 1888, supplemented by a report upon mines, minerals, and localities, &c., in the Eastern Division of the District of Kootenay.

"Mining development and industries have absorbed a good deal of interest in this district during the past season, the following being some of the results:—

"*Porcupine Creek.*

Upon which placer mines have been discovered and worked during the past season, is a tributary of Quartz Creek, which heads in the Selkirk range about 8 miles east of Rogers' Pass, and empties into the Columbia River at Beaver Station, on the C. P. R., 11 miles west of Donald.

"Some three years ago gold was found in Quartz Creek, but not in paying quantities.

"During the past summer, Henry Lovewell, a miner, who knew of the existence of gold in that locality, induced three other miners to accompany him on a prospecting tour, when, after being in the mountains for some time, they discovered upon Porcupine Creek what promised to be paying placer mines. They immediately staked off and recorded discovery claims, which were located a short distance above the confluence of Porcupine and Quartz Creeks, being about 16 miles above the mouth of the latter.

"The Discovery Company have worked upon the ground since about the middle of August, when they commenced establishing a camp, building houses, getting out saw-logs, making sluice boxes, turning the waters of the creek, and setting their sluices, &c. They commenced shovelling into the boxes on the 20th of September, and were able to work till the 14th October, when, frost setting in, they had to close out for the season, the result of the 23 days' sluicing being an output of 14 ounces and 16 pennyweights of gold to each man—about $11 per day to the hand. The gold taken out shews much that is apparently fresh from the matrix, fine particles of quartz in many instances still adhering to it. It is very bright, and presents no appearance of having been washed any great distance. The largest piece taken out was worth $11.60. In washing up, much fine quartz, galena ore, pyrites of copper, and some native silver, has been found. The depth of ground above bed-rock runs from three to six feet; the formation is slate bed-rock intersected by auriferous quartz ledges of various thicknesses, latter showing granite in places.

"Good prospects are obtained pretty generally throughout the hill at the north side of the creek, which shows a very heavy gravel wash, except where covered over by *débris*, the result of slides, which occur occasionally in that locality.

"Some 30 claims are now held upon Porcupine and Quartz Creeks, which have been staked off above and below the confluence of the former with the latter. The claim owners, other than the Discovery Company, having commenced operations late in the season, and having deeper ground to work, had not been able to get upon pay before the season closed. It has been ascertained, however, that gold is generally diffused throughout the alluvium upon which these claims are located.

"On or about the 1st day of June next, the miners expect to open up their claims. The water in Porcupine Creek, at any time, does not exceed 500 inches, so that there is no 'high water' to contend against, and a hope is entertained that more extensive discoveries will be made before the close of 1889.

"It is to be regretted that few of those at present interested in these mines are practical miners, and it would be of advantage to the district if the attention of some of the old placer miners of Cariboo and elsewhere in British Columbia, were attracted thither during the coming season.

"The above mines are about eighteen miles from Donald, the present trail running a good deal at right-angles, first going west and then turning southwards. In a direct line the camp is not more than ten miles south of Donald.

"*Weaver Creek.*

"Mr. Leonard, a miner of great perseverance, who has stuck all alone to this creek for years, has taken out during the past season about $5,000 in coarse gold. Weaver Creek is but a short distance from St. Joseph's Prairie and Cranbrook.

"*Palmer's Bar*

Yielded to a company of four Chinamen $1,023.

"*Bull River*

Disappointed the miners, there interested, very much. Some heavy work was done in wing-damming that river, but it was discovered, when prospecting the ground freed from water, that the pay must have shifted to the other side, at the point where they left off last year, as the pay-lead could not be found. They took out about $750, and intend reversing wing-dam next season.

"*Moyea River.*

"Output to three Chinese, who had this locality all to themselves, was in the neighbourhood of $700.

"*Wild Horse Creek.*

"The claims on this creek, chiefly hydraulic, are supposed to have done better than last year. Owing, however, to the respective claim owners having deferred cleaning up their flumes and sluices for the season to a late date, a severe frost overtook them and prevented them from bringing that work to completion; consequently, the exact amount in excess of the total output for 1887 is not known. The amount realized from the partial wash-up was $24,400, to which may be added about $4,000, the result of desultory mining by Chinese having no regular locations. David Griffith, who is now one of the oldest Kootenay miners resident in the district, is the owner of an extensive hydraulic mine; he commands an excellent head of water, and used a 'giant' on his ground to great advantage, but having, with others, delayed in washing up, he cannot now do so till next season. He has not cleaned up for three years, and it is estimated that there must be from $12,000 to $15,000 in gold dust in his boxes.

"*Deep Diggings.*

"The Perry Creek Gold Mining Company, owing to there being no waggon road to their mines and to the different pieces of metal being too heavy for pack animals, were unable to have the machinery for their large pump transported to its destination, and, consequently, the shaft, which, with much expense, skill, and labour, had been sunk to bed-rock last year, had to be temporarily abandoned, it being impossible to contend against the water without the aid of machinery. They have, however, during this year concentrated all their energies upon their mining ground known as the 'Mount Cenis Tunnel,' lower down the creek. This ground is supposed to be rich, but requires a large capital to thoroughly test it. Substantial buildings have been erected, comprising dwelling and boarding-house for employés, storehouse, and an office. A dump-house has been fitted up, wherein everything, under the able management of their efficient foreman, Mr. Dow, an old Cariboo miner, has been placed in perfect order for the winter's work,—stove, dump-box, water heads and gates, and hydraulic air-pipes for the tunnel, being in place and order. The length of the tunnel, which gives evidence of first-class work all through, is now about 580 feet. This tunnel is run at a higher level than the old one, and for the most part goes immediately over it. Pay was not expected till bed-rock was reached and the cañon, through which the old channel originally ran, was passed. By latest accounts bed-rock had been struck, and although quite smooth, being not yet past the cañon, a condition which generally prevents it from retaining the gold upon its surface, a very fair return from the last week's work (only one shift employed) was produced, about $515 being taken out of the dump-box. The company are now sanguine as to the success of their enterprise, to which, in the opinion of all, they are fairly entitled, considering the amount of capital they have invested and the courageous perseverance they have evinced under many difficulties. The work will be vigorously carried on with two shifts, *i. e.*, a day shift and a night shift, during the winter.

"*Findlay Creek Mining Company (Hydraulics).*

"This Company has a first-class ditch and flume about 5¼ miles long, and of a capacity of about 700 inches of water. The head at lower end is about 200 feet. The hydraulic plant consists of a 15-inch water pipe, No. 2 giant, and about 400 feet of 30-inch sluice, and has a capacity of about 1,000 cubic yards per day, of 24 hours, in ordinary gravel.

"The dead work, through clay and cement, is about finished, and a gravel bank of about 100 feet deep, which prospects well, has been all but reached.

"It is thought that the bed-rock of one of the old channels coming in from the north will be struck in June or July next, and that good pay will be the result.

"The company has erected good houses, a blacksmith's shop, storehouses, &c., and has all the necessary tools and appliances to carry on the work; also a circular saw-mill of average capacity.

"A prosperous season is expected next summer.

"Below the Findlay Creek Mining Co.'s ground the 'Adela' Mining Co. has completed a ditch and flume, nearly 3 miles long—capacity, 300 inches—and has put up hydraulic works. The hydraulic was only run for a few days this past fall, but the prospects were satisfactory.

"Some good free gold quartz ledges have been discovered in the vicinity.

"*Location and Development of Mineral Claims.*

"Commencing south at Wild Horse Creek, that noted field for placer mines in early days, I may state that there are located and recorded in that locality five quartz claims.

"The rock shows a fine grained galena which assays from $20 to $80 to the ton in silver. One claim, owned by Faust & Co., has considerable work done upon it, the rock assaying very well, whilst the others have merely the law-requiring representation done.

"In the mountains east of Windermere copper ore has been discovered, with very favourable indications, and claims staked off and recorded. The assays give over 30 per cent. of copper.

"*Toby Creek.*

"A great ledge is reported to have been struck on this creek.

"From Messrs. McKinnon, Rosemond and Kirkpatrick the following particulars have been gathered :—

"The above is a stream of considerable volume, adding its waters to those of the Columbia River, at a point some four miles northwest from Windermere, and one mile below the salmon beds, near the mouth of the Lower Columbia Lake.

"About four years ago there was a local rush to Toby Creek, a report being then current that it abounded in rich alluvial deposits, at which time considerable gold was taken out in crevicing by the then comparatively uninitiated miners.

"For the first five miles up stream from the mouth, the formation appears to belong to the superficial accumulations ; then is reached a conglomerate belt about four miles wide, apparently an ancient river bed.

"To the westward of this belt a formation of slate and gray granite commences, interspersed with reefs of porphyritic lime, continuing so until the vicinity of the glacier belt is arrived at.

"The point where the Discovery claims are located is some twenty miles from the mouth of the creek, the ledge cutting the creek at an angle of about forty-five degrees, in a N. W. by S. E. direction.

"The ledge or ore bearing rock is about 24 feet in width from wall to wall, the hanging wall being gray granite, the foot wall slate. The developments are opened at an elevation of one hundred feet above the level of the creek bed, and consist of an open cut fifteen feet deep and twenty-five feet back from outer edge to face of cut. This cut exhibited a pay streak of galena five feet wide, which assays sixty-five ounces in silver, seventy per cent. lead, with a good trace of gold.

"The altitude of the 'Jumbo' mine, whereon the above developments were made, is about 3,500 feet above sea level, and is in the midst of a thickly wooded country, but the lead can be traced beyond the timber line.

"At present there are only five claims located on the lead, which by all accounts is a true fissure, holding an invariable course in a N.W. by S. E. direction.

"The creek bed is nearly as level as a road bed, so that the chief obstacles in the way of road construction would be the expense of cutting and swamping the timber and underbrush. It is also beneficially surrounded with a luxurious pasturage of bunch grass; in fact, the bottom opens up into a small valley a short distance above the claim.

"Several assays have been taken very recently, which go much higher than that above quoted.

"*Jubilee and Spillemcheen Mountain.*

"This mountain, apparently three distinct buttes, for all practical purposes may be described as a ridge some seven or eight miles in length by from half a mile to three miles wide, the summit being about 2,000 feet above the Columbia River, the latter from the mouth of Spillemcheen Creek, flowing in a north by west direction ; the base of the mountain being on an average about a mile distant.

"The general formation is of lime quartzite or porphyritic lime ; there is also to be seen a black line of a shaly nature.

"All ores in these buttes predominate in silver and copper ; other metals have shown up in testing, but in small quantities.

"Up to the present assays have varied very materially, giving returns of from twelve to two hundred dollars per ton in silver.

"On the western side of Jones' Butte, upon which is located the great 'Spillemcheen' mine, owned by Jones and Wells, there is one contact vein which might be partially described. It is a galena ledge of vast extensions, taken up in 1884, by Thomas Jones, one of the earliest prospectors in the field since commencement of C. P. R. construction. The croppings equal in bulk those of the Treadwell mine on Douglas Island in Alaska, and upon the numerous claims since located along the line of croppings it has been developed to some considerable extent. The mines, 'Spillemcheen' and 'Rothschild' are opened by tunnels from fifty to one hundred feet in length; the ore is low grade, carrying, among other bases, copper, zinc, antimony and a light trace of tin. Making an average of the different assays taken, it will not exceed $12 per ton, so far as is at present known, but by concentrating it will yield fifty per cent. in lead, and $20 in silver. There is also a strata or pay shoot of Red Quartz running through it, which gives a return of $5 in silver and $3 in gold

"The lode is so extensive that, taking into consideration the great advantages the resources of the surrounding country afford for reduction works, if taken hold of by the right men with capital, and mined on an economic and practical basis, this property alone would prove of inestimable value, even if only clearing $2 per ton.

"Messrs. Jones and Wells have this fall made a rough waggon road from their mines to the Columbia River, and are busy in getting out ore, which it is their intention to ship next spring, so soon as navigation commences on the Columbia River. They have at present about 200 tons on the dump.

"*Jubilee Camp.*

"About four miles up the trail from Jubilee Landing, Columbia River, are numerous locations, upon most of which considerable work has been done, and from which rich assays have been had; some of the rock gives a good percentage of copper, and yields from $40 to $160 in silver to the ton. The Law and McIntyre locations 'Constance' and 'Atlanta' were the first made upon the Jubilee end of the mountain, having been recorded a little over eighteen months ago. The development work on the 'Constance' consists of a 50-foot shaft, and of 3 open cuts. The shaft passed through several pockets, and is now at its greatest depth in ore. It was put down last winter when no difficulty in carrying on mining was experienced, the greatest depth of snow not exceeding 30 inches snow disappearing altogether in April.

"That work, however, has been temporarily abandoned, and a tunnel commenced to tap the shaft at a distance of 400 feet, N. W.

"Mr. Law has recently returned from the east, where he has succeeded in advantageously bonding the mines 'Constance' and 'Atlanta,' to a company or firm in Toronto, possessing ample means and enterprise to develop them.

"From the mines last mentioned to the northwest end of the mountain, a distance of two miles, the croppings of a continuous ledge have been located, but no work of any significance has been done, except on Campbell's 'Mayflower' and Kellie's 'Scotch Giant.' At a point on the 'Mayflower,' where apparently three fifteen-inch veins meet, Campbell has stripped the main vein for fifty feet, exposing ore the entire distance; at this point an open cut will be made to prove the size and character of the ledge.

"Mr. Kellie has done similar work on the 'Scotch Giant,' with a like favourable result

"The ore from these claims is of the same character as that found at the McCrea and McIntyre groups, showing distinctively that the deposit or ledge is a continuous one for a distance of over four miles.

"*The McMurdo Section,*

"Situated about thirty miles southeast from Donald, and promising to be the richest quartz centre in East Kootenay. The following brief description, touching upon its formation and resources, may not be amiss:—

"Starting for that locality from Hayes' Landing, on the Columbia River, about 24 miles above Golden, the trail follows a tortuous route for about five miles over and around the benches flanking the western shore of the Columbia.

"This portion of the country may be said to belong to the secondary formation, although it has a thin covering of superficial accumulations. It is almost entirely barren of timber of any market value, but it abounds with a growth of bunch grass which will be a great aid to those engaged in freighting, &c., in time to come.

"On reaching the summit of what is locally known as the 'first divide,' an altitude of some four thousand feet above sea level is attained. The vegetation here is in a comparative healthy condition, nature not having had to contend so much against 'forest fires,' which periodially commit such ravages throughout the country. Upon passing the 'divide' a descent is made into the valley of the north fork of the Spillemcheen, when a country is traversed rich in timber, groves of spruce, fir and jack-pine, suitable for either mining or commercial purposes. It is also well stocked with meadows of wild timothy, and dotted here and there with tiny rivulets and excellent springs.

"While ascending the second divide, about 17 miles from Columbia River, traces of the sandy slates and silurian limestone of the transition period are noticeable, but the country is not tilted up enough to admit of an emphatic statement.

"This ridge reaches an elevation of nearly 5,000 feet, the trail crossing it at a lower level, about 4,500 feet, and is densely covered with a fine growth of timber peculiarly adapted for mining purposes. When the summit is reached, for the first time do the bleak and rugged peaks of the main range of the Selkirks come in view; the trail then descends into the valley of the middle fork of the Spillemcheen, which is followed crossing and recrossing the creek about 16 times, till the Glacier Belt is arrived at. Timber along the stream is scarce, having in places been destroyed by fire, and again by the mechanical forces of snow slides. At this point quartz reefs are observable on either hand, becoming more numerous as the stream is ascended; they are mostly of a gold-bearing nature.

"The general formations are chiefly slate and granite, the country rocks consisting of clay-slates, crystalline limestones, mica, schists, and rocks of the primary strata.

"The mountain peaks, especially in the Glacier Belt, are both massive and columnar, affording, I should imagine, a most extensive and interesting field for geological research.

"The metalliferous resources of this section seem to be unlimited. The mineral belt by general estimation is at least ten miles wide, but being as yet unexplored, it may be more or less; however, it is safe to conjecture that it extends from Illecillewaet to the Kootenay Lakes, with a variable width of from five to ten miles.

"The McMurdo camp proper takes in a stretch of country some nine miles long and about four wide. The greatest and richest of the deposits as yet known are near the heads of the Middle Fork, Carbonate and Copper Creeks, where mineral seems to abound in every direction.

"The veins are nearly all true fissures, running an invariable course for miles in a N. W. and S. E. direction, with a general dip towards the east.

"Copper Creek is a tributary of the Middle Fork, emptying into that stream at a point about one mile below where the present trail reaches it. The South Fork basin offers many attractions to the prospector for an examination next summer, as it is reported by McMurdo, who is the only white man known to have visited that locality, to contain numerous and extensive out-croppings of quartz leads.

"This section is between twenty and twenty-five miles distant from the banks of the Columbia River and could be tapped by a trunk road following up the Spillemcheen; thence trails could be cut up the South Fork and Copper Creeks, and also to the Big Buttes and Jubilee, as somewhere along the banks of the Spillemcheen will be the site of the reduction works necessary to utilize the vast and latent mineral resources of this section.

"McMurdo, the original discoverer of mineral in that country, has bonded two mines upon which enough work has been done to prove that the claims are rich, high assays being obtained, and ledges of satisfactory dimensions uncovered.

"The 'Monitor' mine, the property of Low and Dainard, has had a tunnel run in to the ledge eighty-two feet; two open cuts have also been made, proving that there is four feet of solid ore which assays $100 in silver and $8 in gold to the ton, besides carrying a good percentage of lead with a showing of gray copper. This mine has been bonded, and extensive development will be done upon it next season. Close to the Monitor is the Crescent ledge, upon which are seven locations. The assessment work on the 'Crescent' mine exposed a pay streak from four to six feet wide, and similar in character to that in the 'Monitor.'

"An assay made by McVicker, of Salt Lake, from ore taken from the Crescent, gives a return of $226.03 in silver and $8.44 in gold to the ton, besides 39 per cent. in lead, and 11 per cent. in copper. That mine, and another in the same locality, has also been bonded.

"Further assays have been made from ore taken from same locality, by Bredemeyer, of Vancouver, with following results: Sample No. 1 carried $164.41 in silver and $48.23 in gold

to the ton, and 46 per cent. copper. No. 2 gave $146.99 in silver and $48.25 in gold to the ton, and 41 per cent. copper. The above was from picked samples of gray copper.

"Carbonite mountain, a short distance from the above, possesses very fine indications. On its western slope are croppings of a ledge nearly two miles in length; eight locations have there been made and recorded. An assay made at St. Paul, for George Stark, one of the claim owners, gives over $100 in silver, and one ounce of gold to the ton; the latter of a quality realizing $20 to the ounce. Development so far has proved that the belt is beyond a doubt rich, and lies close to the surface, the pay shoots lying under the loose earth and vegetation.

"The formation being slate and granite gives no indication of the minerals pinching out, but proves the belt of true fissures; each prospect-hole shows a dump of from one to ten tons of good ore, the shoots growing larger the deeper they are followed. The veins are easily traced for miles; on two of them sixteen locations have been made, eight on each, and they still keep on their course into an extensive range of mountains as yet unexplored.

"From the numerous deposits and high grade ores already discovered, combined with the natural facilities and unlimited resources of timber and water suitable for milling purposes, the McMurdo country cannot but be, at some not far distant date, a rich and prosperous mining centre, such as hitherto the Province has not known. It is easily accessible from any point on the Columbia River ten miles south of Golden; there are no serious obstacles in the way of waggon road construction, neither are there any insurmountable difficulties in the way should it be contemplated at some future day to bring in a branch from the main line of the C. P. R.

"The Monarch mine, at Field, lately purchased from the Coffman Brothers by the British Columbia Smelting Company, is being rapidly developed, large shipments of ore being forwarded daily to the smelting works at Vancouver.

"Dwelling and boarding-houses, an office and blacksmith's shop, &c., have been erected near the mines.

"A car track has been blasted out of the solid rock, along an almost perpendicular face, for a distance of about 1,000 feet; in one place, for a short distance, a tunnel having to be run through the mountain. About 850 feet of this track is covered over by substantial shedding, to protect the men while working. The elevation of the track above the C. P. R. line is about 800 feet.

"The cars are filled at the chute at the mine and then started down grade to upper bin (dimensions 30x30x30), into which the ore is dumped upon their arrival at that point. The empty cars are then, two or three at a time, hauled up by horse-power to the place of commencement, viz., the chute at mine. At upper bin the ore is again loaded in cars and run down to lower bin (dimensions 30x30x20), a distance of 1,100 feet, where the loads are dumped.

"It is so arranged that when the loaded car is started from the upper bin it hauls up the one just emptied at the lower bin, by which means much labour in hauling up grade is saved.

"Up to the present date over 600 tons of ore have been shipped to the smelting works at Vancouver, and it is the intention of the company to keep shipping steadily, the supply being apparently inexhaustible.

"The work done upon the mine consists of drifts, cross-cuts, upraises, and tunnel work. Total number of feet underground work is 370, of which about 270 feet is in ore, the average thickness between walls being about 4½ feet.

"The best ore only is shipped to Vancouver, the residue being retained upon the ground for concentrating purposes, under which process it can be profitably disposed of.

"The company have thirty men steadily employed upon and in connection with their mines, and have expended a great deal of money on account of labour, tramway machinery, cars, track-rails, tools, lumber, &c., &c.

"From the spirit and enterprise demonstrated by the very thorough manner in which the mine is being worked, and ore shipped, &c., the company is deserving of the most entire success—a result which will be looked upon, by all who are interested in the development of the country, with much satisfaction.

"*Otter Tail.*

"Although excellent prospects have been obtained and much money expended in the vicinity of Otter Tail Creek, situated about six miles west of Field, yet, since the destruction by fire, in 1887, of the stamp-mill, saw-mill, store, and dwelling-houses, &c., erected by the Otter Tail Company, nothing towards development has been done.

"In addition to those reported upon, there are many other promising mineral claims in this district needless to particularize, especially as but little work has been done upon them.

"Mineral claims located and recorded this year amount to 109; placer mines about 40.

"*Coal.*

"The extraordinary rich deposits of the above mineral at Crow's Nest Pass, in the Rocky Mountains, have been fully reported upon by me last year, since which time there is little of interest to mention.

"This year, about six miles south-west from Golden, J. M. Kellie and Harry Estelle have discovered what they report to be a 21-foot seam of coal, which, from surface indications, is thought to be anthracite, and which, if true, cannot but give a great impetus to all branches of industry, &c., in that vicinity.

"*Slate.*

"A ledge nine feet in width, of an excellent quality of slate, has been discovered by Walter Hogg, a prospector, 6½ miles east of Golden, and only a few hundred yards distant from the C. P. R. track. Specimens of the slate were brought to Donald, which were of a blue-black colour, of smooth surface, hard to break, and of good grain. The discoverer states that slabs of any desired size, such as beds for billiard tables, mantels, flagging, &c., can be taken out, and that it is especially adapted for roofing purposes.

"During the past summer I have visited nearly all the localities named. As, however, my stay at any of these places was necessarily short, other business requiring my presence elsewhere, I have been indebted for much of my information to miners and others interested in and visiting the different camps reported upon.

"In conclusion, I would state that I consider no country could have a brighter promise ahead than has the Kootenay District; and if one-hundredth part of the prosperity foreshadowed by the inestimable riches, consisting of minerals, timber, and water-power, &c.,—ample indications of which have been ascertained beyond a reasonable doubt,—is realized, then will it be proved that British Columbia has resources within herself of a lasting nature, such as have been hitherto unparalleled in the history of Canada.

"I have, &c.,

(Signed) "A. W. VOWELL,

"*G. C. & S. M., &c., Kootenay.*

"*The Honourable John Robson,*

"*Minister of Mines, &c., Victoria.*"

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE,

"CLINTON, B. C., December 21st, 1888.

"SIR,—I have the honour to enclose herewith mining statistics, and my annual mining report, for the District of Lillooet for the season ending 30th November, 1888. The year has been fairly good; as a rule abundance of water for all mining purposes; floods in June cleared out wing-dams, etc., on Cayoosh Creek, necessitating a renewal of everything on the subsidence of the water. A cold snap early in November stopped work for about ten days, but at the present writing, most of the claims on that creek are still working. The total yield of gold (ascertained from reliable sources only) is $90,160. Of the amount carried away in private hands, any estimate of mine would be imaginary, the Chinese being the principal miners in the District. The above amount is again under that of the last four or five years. I attribute the shrinkage this year to two causes: 1st, not much above half the usual number of Chinese miners, and, 2nd, to the unsettled state of the mining community generally, consequent on the discovery of free gold bearing ledges in the immediate neighbourhood of Lillooet last fall, which has taken up the time of the white miner this season in prospecting the mineral claims located by them. For comparison I append statement of the mining and mineral claims recorded in the District in 1887 and 1888.

	1887	1888
"Mining (alluvial) claims recorded	230	135
"Mineral (quartz) " "	53	116

"The above shows that over twice the number of mineral claims have been recorded in 1888 that were in 1887, while in the same time the record of mining claims is 95 less, and so far it is the mining claim that gives gold returns in this District Of the total yield this year, nearly $60,000 worth has been bought by Mr. A. W. Smith, of Lillooet, and I think I am safe in saying that seven-eighths of this amount is from the Chinese mining claims on Cayoosh Creek. Mr. Phair, Mining Recorder at Lillooet, reports to me 'that during the season there was only 'half the usual number of Chinese miners; they have done very well on Cayoosh Creek; a 'party of them who left for China took $4,000 with them in gold dust. One company of five 'averaged $100 a day. Others are paying from $4 to $10 to the hand, but not having proper 'machinery, they cannot reach bed-rock in the creek. If capitalists were to take up the 'abandoned ground on this creek, they would undoubtedly have large returns for their outlay. 'Rocky barriers at the mouth of the first cañon could easily be blasted out, which would 'lower the creek above many feet. White miners on the south fork of Bridge River—about 'twenty—have done much better than in past years. A party of six took out in a week $494 'in coarse gold. Seventeen Chinese miners flumed part of Cayoosh Creek, and they are now 'making $5 a day to the hand, with every prospect of striking it richer on bed-rock, if they 'can reach it.'

"I personally examined the trails and claims on this creek in October last for a distance of about eight miles. The creek, or more properly speaking mountain torrent, flows through a narrow cañon from which rise precipitous mountains, rugged, torn, and shattered in every form, from violent upheaval, and stretching upwards, in all shapes, to the line of perpetual snow. The trails, often not more than a foot wide, wind along these mountain sides in several places. I noticed the most dangerous, the so-called trail was an imaginary one, as the passing foot-mark of man or horse is immediately filled up with slowly descending shale, and it seems almost incredible that accidents are not the rule instead of the rare exception. A sum of $2,000 (wholly inadequate) was placed on this year's estimates for a road along the line of the creek, but careful and exhaustive surveys would require to be made on both sides of the creek previous to any attempt at road making. Without taking into consideration the number of quartz ledges that have been located on both sides, and in the immediate neighbourhood, there can be no doubt, I think, that the bed of the creek will give rich returns for many years, provided that it is worked in a proper manner, and the Chinese miner will certainly never accomplish that. One thing certain, the mineral claim first requiring machinery must make a road to get it in. My furthest up point was about eight miles, the barometer reading 1,300 feet above sea level. The Bonanza Co.'s claims, situated on a mountain ridge or back-bone, rise from the creek at this point at an angle of at least 50°, and as they have six claims located along the line of the ridge, I should judge that the extreme upper end of their ground must be close on 6,000 feet above sea level.

"*Quartz.*

"On the various locations made in the eastern portion of the District, viz., Deception Creek, Mahood Lake, and Clearwater, there has not been any work done this season. Mr. Allingham has been at work on his claim on Mad River, and under great difficulties, from its isolated position, high water, and loss of cached stores, etc., stolen by Indians.

"*Foster Gold Mining and Milling Co., located on the Big Slide.*

"I regret that I have again to report that everything in connection with this company has been at a complete standstill during the past season.

"Nearly the whole of the quartz claims recorded this year are situated west of the Fraser River, and on the eastern slope of the main chain of the Cascade Mountains. The ledges so far discovered carry free gold with traces of silver, gold and silver, silver and galena. Of the last named class a wide ledge was discovered this fall, some eight miles from the west end of Anderson Lake, by Mr. Jensen, an old experienced miner, who informs me that he considers it a true fissure vein of good quality, but, like the claims on Cayoosh Creek, very difficult of access. Of the claims recorded this season, only a small proportion of them have had the necessary work

done on them to enable the locators to hold them for a year under the provisions of the Mineral Act. On the Bonanza ledge work has been carried on without intermission by the company owning claims there—since the recording of the Discovery last fall. A 50-foot shaft was sunk last winter and prospecting generally during the whole of the past season. The company are engaged at present in running a tunnel, which, at about 100 feet, is supposed to intersect the ledge at a distance of 250 feet from the surface The secretary of the company has handed me forty-two different assay returns (made in Victoria, Cariboo, Vancouver, Ottawa and San Francisco) of the ore from different parts of the ground, from which I find the average is little over $47 per ton of 2,000 lbs. The returns, in every case, are the same, viz., free gold with traces of silver. On the free gold ledges located on Big Bar Creek, and referred to in my report of last year, there has not been any work done this season. This remark applies also to the leased ground of the Fraser River Cable Co. A lease of abandoned mining ground on St. Mary's Creek, west side of Fraser River, was given last summer; up to the present I have not had any report from the lessee. Of the mineral claims located this year on Cayoosh Creek, Seaton and Anderson Lakes, several are owned by capitalists in Victoria, New Westminster and Vancouver. I trust those gentlemen will, in their own interests, see that energetic developments are commenced at an early date in the spring of next year.

"I have, &c.,

(Signed) "F. SOUES,

"*Gold Commissioner.*

"*To the Hon. John Robson,*

"*Minister of Mines, Victoria.*"

YALE.

Kamloops Division.

MR. HUSSEY'S REPORT.

"KAMLOOPS, B. C., December, 1888.

"SIR,—I have the honour herewith to transmit my mining report of the Kamloops Division of Yale District for the current year.

"*The Stump Lake Mines.*

"A mineral field of great promise, situated among the hills in the vicinity of Stump Lake.

"It has the advantage of being easily accessible by a good waggon road which connects Kamloops and Spence's Bridge, both stations on the Canadian Pacific Railway.

"The mines so far discovered and partially developed are about thirty miles from Kamloops, and in close proximity to Stump Lake, a sheet of water about one mile in breadth and seven miles in length.

"There are three companies in the district, who for the past year or more have shown an unusual amount of energy in developing their property, namely:—The Nicola Milling and Mining Co., the Star Mining Co., and the Mary Reynolds Co.

"The Nicola Milling and Mining Co.'s property consists of over twenty locations, all of which are being more or less developed. The principal ones, however, on which a steady development is being performed, are the 'King William,' 'Tubal Cain' and its extensions, and the 'Joshua.'

"The King William shaft is down 110 feet, and a level is also being run north from the main shaft, shewing in places a body of ore about seven feet in width.

"The shaft at the Joshua is down 240 feet, from which four levels have been run in a northerly and southerly direction, to a distance of 100 feet, which has clearly demonstrated the fact that the ore body is continuous and of good quality.

"The 'Tubal Cain' shaft is down about 130 feet, and, as in the other works, the shaft and levels are being pushed ahead as fast as men and machinery can do it. From this shaft a 50-foot level has been run north a distance of 160 feet, shewing a fine body of rich ore. At

the 110-foot levels are being run both north and south on the vein, and up to date there is no change in the ore, which is of the same quality as that procured at the 50-foot level. Two tunnels are being run in from the side-hill on the ledge to a distance of 600 feet; the lowest one will tap the shaft at a depth of 260 feet

"The company are employing a force of from fifty to sixty men at their mines, and it is to be hoped the developments on their property will be sufficiently advanced by next spring to warrant the company in erecting reduction works. The ore on the dumps amounts to about 3,000 tons, of which more than half is first class milling ore, which will average $30 to $40 per ton.

"These mines are considered one of the best developed mineral properties in the Province, employing more men than any other, and working entirely on their own resources; they certainly are worthy of special notice.

"The Star Mining Co. have shown unusual energy in developing their mine, by sinking a shaft 100 feet in depth, at the mouth of which a horse whim and blacksmith shop have been erected. The ledge is four feet in width, with a pay streak of about twenty inches. The assays range from $20 to $600 per ton.

"The Planet mine, which is also the property of this company, is being developed in a business-like manner. A shaft 40 feet in depth has been sunk, and at the bottom a level has been driven in a northerly direction, which exposes a magnificent body of ore which has assayed an average of about $95 to the ton. The owners of these mines have been engaged during the summer in drifting, taking out rock for milling purposes, and shipping concentrates. The rock was hard quartz, shewing galena, iron sulphurets and gray copper. The copper did not run over 4 or 5 per cent. The result of several assays of picked specimens, of which the following are two:—576 oz. silver and 2¼ oz. of gold per ton; 407 oz. silver and 1½ oz. of gold per ton.

"The nearest point of shipment is Kamloops, to which place it costs about $10 per ton to haul. The plant of the Star Mining Co. is very complete, but not large enough to be profitable. It consists of a rock breaker and a quartz mill and two Triumph concentrators. The last named have done their work well, but the quartz mill is not a success, owing to the hardness of the rock.

"The reduction involved in the concentration is about 1 in 7, or about 12½ per cent. Economically considered, the reduction should still further be continued before shipment. Experts consider it would pay to reduce the ore to bullion by roasting, and possibly by leaching, on the ground.

"The cost by the time the concentrates arrive at San Francisco and are smelted are as follows: $10 per ton for freight from the mines to the railway, $4 to Vancouver, $5 to San Francisco, and from $10 to $14 per ton for smelting, which makes a total cost of from $30 to $40 per ton.

"The 'Silver King' Mining Company, owned by Asbury and Jensen, of Victoria, are sinking a shaft, and a contract has been let for 60 feet, 36 feet of which is already completed at a cost of $12 per foot. The shaft is 8 feet by 4 feet. Indications are very favourable.

"A company of Victorians are operating the Jenny Long, Longfellow, and Dentist mineral claims, and a contract at $14 per foot has been let for sinking a shaft on each claim. The shaft in each instance is to be 100 feet in depth The Jenny Long claim contains free gold in what is considered paying quantities.

"The Hepburn claims are being developed, and ore will be shipped during the winter.

"Assessment work is being prosecuted on the 'Silver Queen' mine, and the shaft is already several feet in depth.

"The Azela mineral claim, owned by Wm. Palmer, is one of the most promising in the district, and will prove very valuable should further developments expose rock equal in value to what is now in sight.

"Messrs. Wright and Fletcher are the owners of several mineral locations, amongst which the most valuable are the 'Minnie,' 'Idaho,' 'Banner,' and 'Bertha.' A shaft has been sunk on each claim and sufficient work has been done to demonstrate the value of the property, which possess lodes from 3 feet to 4½ feet in thickness. The ore assayed from these mines is estimated to be worth from $75 to $250 per ton. The owners expect to begin active operations next spring.

"The 'Mary Reynolds,' owned by Jos. Hepburn & Co., has two shafts, one about 90 feet and the other 40 feet in depth, with sufficient ore in sight, both in quantity and quality, to enable the company to ship direct to the reduction works at San Francisco, without the

necessity of having it concentrated, and this is being done as rapidly as circumstances will permit. The assays range from $375 to $1,000 per ton.

"The 'Gold Cup' has a shaft about 15 feet deep, exposing a fine ledge which has assayed about $90 per ton.

"I have only referred to the leading mineral claims, upon which work has been vigorously prosecuted with most favourable results. During the past twelve months fifty-six new claims have been recorded at the Government Office at Kamloops.

"*Placer Mining.*

"The mines on Tranquille Creek continue to yield a regular supply of coarse gold of first class quality, but as the claims are exclusively controlled by Chinese, it is impossible to secure reliable information regarding the quantity of gold obtained. Between thirty and forty Chinese are regularly employed in placer mining on this creek, which is situated about seven miles from the town of Kamloops.

"*Coal.*

"Croppings of coal were discovered this spring by James Guerin, about two miles south of Kamloops. He ran several small drifts in the mountain where it had been cut through by a gulch, and found a number of small seams which had every appearance of being bituminous coal. At the same time Mr. Geo. Loney ran a tunnel twenty-five feet into the hill, on the opposite side of the gulch, and cut across six or eight small seams. He then sunk a shaft and cut through several seams ranging from one to eight inches, at a depth of 23 feet from the surface.

"At 38 feet they struck a new formation of sandstone, and blasted through that for 22 feet, with very little change.

"They are now running a drift on the seams above mentioned 22 feet from the surface.

"The Guerin Company are also running a tunnel, and are in about 200 feet. The coal is bituminous, and is superior to any found in the North-west, being considered quite equal in quality to the celebrated Nanaimo coal.

"It burns freely in an open grate with little draught and leaves a fine white ash. Several tons have already been taken out, and it is expected that the two companies now at work will shortly be able to supply this section, and before another year has expired make arrangements for exporting.

"I have, &c.,
(Signed) "FREDERICK HUSSEY,
"*Government Agent.*

"*The Honourable John Robson,*
"*Minister of Mines, Victoria.*"

Okanagan Division.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE,
"VERNON, 17th December, 1888.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the Osoyoos Division of Yale District.

"*Cherry Creek.*

"The prospects on this creek are looking up, both in placer and quartz mining The Chinese (in all about 40), I am informed, have done much better this summer than for some years past.

"The Cherry Creek Mining Company (Mr. John Merritt, foreman) are still running their tunnel into the hill, trying to find the lost channel.

"The quartz mines on the Monashee Mountain claims, under the superintendence of Mr. Donald McIntyre, have taken out some very rich quartz this past summer, and, during an interview I had with him, he informed me that he intends making arrangements this winter, with the companies he represents, to place machinery on the ground this coming summer.

"The Hidden Treasure Mining Company have also done considerable work on their claims this year, but with what results I am not in a position to state.

"*Mission Creek.*

"Very little has been done in the way of prospecting this creek during the summer, only a few Chinamen, with one or two whites, making a bare subsistence.

"*Rock Creek.*

"On the 10th of August of the present year I visited this creek, and was very agreeably surprised to find such a well-constructed little mining town, called after the discoverer, 'McKinney.' I found the mines, as they have been represented to be, very rich; and, in my opinion, it is only a question of a very short time when there will be one of the richest mining camps ever known in this Province.

"Mr. Douglas, manager of the Douglas Mine, representing New York capitalists, has his claim in splendid working order, and is as well equipped for working as any mine could possibly be. He appears to be the moving spirit in that camp, and others are waiting on him for further developments, although vast quantities of very rich ore can be seen on the different dumps, showing that considerable work has been done by the miners towards developing their claims.

"I am gratified to learn that Mr. Douglas has struck a very rich vein, at a depth of about 85 feet, which will, I have no doubt, throw a new impetus into mining operations on this creek.

"The Government, at an expense of $1,915.51, built a first-class trail from the Indian village, In-ka-neep, about 20 miles from Penticton, to Rock Creek. Freighters and others pronounce this a good trail, and far more convenient, as it shortens the route to the mines about 15 miles.

"*Boundary Creek.*

"This creek, which is near the boundary line, is pronounced to be rich in minerals, and I have just received a notification, from a gentleman who is prospecting there, that there will be some fine properties developed near the boundary line in British Columbia in a very few years.

"I have, &c.,

(Signed) "WALTER DEWDNEY,
"*Gold Commissioner.*

"*The Honourable*
"*Minister of Mines, Victoria.*"

Similkameen Division.

MR. TUNSTALL'S REPORT.

"NICOLA, December 28th, 1888.

"SIR,—I have the honour to forward the annual mining statistics for the Similkameen Division, in which you will observe that the yield of gold exhibits a decrease from that of the previous year, principally owing to a smaller number of men being engaged in mining, and the exhaustion of some of the mines.

"On Granite Creek some of the bench claims have averaged from $5 to $10 per day to the man, whilst others have paid about wages. Operations in the bed of the creek have been carried on in the majority of instances by Chinese, in ground abandoned by the whites, with fluctuating success. Collins Gulch has kept a small number of men employed who have done well. Slate Creek has yielded satisfactory returns to a limited number of miners. Boulder Creek is gradually being worked out by the Chinese, by whom, with a few exceptions, it has been exclusively worked. The pay on this creek has ranged from $2 to $4 per day.

"The Tulameen River has not attracted as many men as formerly, although a good deal of work has been accomplished on the bars, over a distance of about five miles from its mouth. At its junction with the Similkameen the Chinese have struck some ground which pays well, back of the present channel, and at a considerable height above its level. It can be worked for only a limited period during the season, as the water is obtained from a small creek, which dries up as the summer advances.

"The Chinese on the Similkameen River have obtained from $1.00 to $1.50 per day, and some earn a smaller amount than that mentioned. They, however, manage to lead a comfortable existence with the additional assistance of their gardens, which produce all the vegetables they require. At Princeton, Mr Allison has ten men engaged mining an elevated bench, from which, I am pleased to say, he derives very good returns, although the gravel is encumbered with immense boulders, which necessarily render work laborious and slow. The pay is contained in a stratum of cemented gravel on the surface, averaging from five to six feet deep, lying on a bed of sand. It is a strange fact that the large body of water required to move and disseminate this mass of heavy fluvial drift did not cut into and carry away the soft deposit on which it lies. The same peculiarity is exhibited in the claims at the mouth of Granite Creek.

"I regret to state that the expectations formed of Five-Mile Creek, explored by some Cariboo miners last fall, have not been realized. Two Chinese Companies proceeded there last summer, and reported having made only from 50 to 75 cents per day to the man.

"The yield of platinum is estimated at 1,500 ounces. This is the only portion of British Columbia wherein it is obtained in sufficient quantities to render its production a feature worthy of mention in the mining statistics. It is found associated with alluvial gold, and is composed of two grades, the magnetic and the non-magnetic. Competition has raised its value in the mines to $3.50 per ounce. An analysis has proved this metal to contain a certain quantity of iron, osmium and inidium. The latter is exceedingly valauble, and is principally used for tipping the points of gold pens; also, in a limited degree, for other purposes where great hardness and indestructibility are deemed essential qualities.

"Very little has been done the past season in quartz mining; the owners of mineral claims having satisfied themselves with merely performing the necessary work to hold their locations. The Bonanza Queen, situated above Bear Creek, is claimed by Messrs. Rabbitt, Fell, and Jansen, the two latter of Victoria, and is considered a valuable mining property. The assays average from $50 to over $100 per ton in gold, and $15 in silver. It is the intention of the proprietors to develop this mine next spring, by running a tunnel to tap the lode at a considerable depth from the surface. The 'Nevada,' an extension of the 'Queen,' also exhibits first-class ore. The claims on the O'Donnell ledge, about a mile west of the above-mentioned, remain unworked, although the surface indications are of the most promising character. Want of means, in this instance, as in many others, is the sole excuse for the little labour expended on them.

"On the divide of Wolfe Creek, a tributary of the Similkameen, about twelve miles above Princeton, James Jamieson has discovered an immense body of argentiferous copper ore, over 150 feet in width, assays from which have gone as high as 65 per cent. in copper, and $20 in silver to the ton. The casings are formed of syenite, gneiss and granite. Three extensions have been recorded, named respectively, the Mountain View, Copper Queen, and Copper King. The silver contained will nearly pay for the transportation of the metal from the point of production to navigation on the Fraser, at Hope, a distance of about 65 miles, principally over the trail at present in use. This, I consider, would prove an excellent opportunity for the investment of capital, as the ore can be mined from the surface without any difficulty, and at a small cost.

"Dr. Dawson, of the Dominion Geological Survey, explored the surrounding country during the past summer, and expressed a very favourable opinion of the evidences of mineral wealth he had everywhere encountered, and strongly recommended prospecting in the direction of the head waters of the Tulameen, which his observations induced him to believe would be found rich in auriferous deposits and veins.

"The Similkameen Division yields to no other portion of the Province in regard to the richness and number of its mineral-bearing lodes; but the lack of capital and means of access, seem at present to oppose an insurmountable barrier to their being worked. Ledges abound on the Similkameen and Tulameen Rivers, and on Granite Creek, where mining operations have brought them to view. They are visible in the rock bluffs on the streams mentioned, and they crop out in localities on the mountain sides without attracting the attention of the placer miner, who knows he cannot afford the time and money required to make them valuable; hence the apathy displayed towards a branch of mining industry destined in the near future to support a large and prosperous population.

"I have, &c.,

(Signed) "G. C. TUNSTALL,

"*The Honourable the Minister of Mines.* "*Gold Commissioner.*

REPORT BY W. J. SUTTON, GOVERNMENT ASSAYER.

"VICTORIA, December 31st, 1888.

"SIR,—I beg to submit the following report on the different mines I have visited during the past year, and a statement regarding the mineral resources of the Province:—

"*The Nicola Mines.*

"The Nicola mines are situated in the Nicola Valley, about thirty miles from Kamloops, and consist of a large number of ledges varying in width from one to six feet. The general direction of the ledges being about north-west to south-east. It is a very open country, with low undulating hills, easy of access, and will be very cheap and convenient to mine and operate.

"The principal work that is being done is by the Nicola Milling and Mining Company, Mr. Wills foreman. This Company is doing thoroughly good work, and has expended a large sum of money in sinking and drifting on their different ledges, so as to prove beyond a doubt the existence of a sufficient body of paying ore, prior to the erection of reduction works, which it is to be hoped they will be justified in building, ere long.

"The Company's property consists of a number of veins on what is known as Mineral Hill. Three of these ledges, which were the most promising on the surface, are being worked at present, *i. e.*, The 'Joshua,' 'King William,' and 'Tubal Cain.'

"The following is a synopsis of the work done on these ledges:—

"*Joshua Mine.*

Main shaft, 278 feet deep.
Air shaft, 80 feet deep.
100 ft. level, North drift, 90 feet.
100 ft. level, South drift, 55 feet.
200 ft. level, North drift, 48 feet.
200 ft. level, South drift, 72 feet.

"*King William Mine.*

Main shaft, 137 feet deep.
Air shaft, 50 feet deep.
50 ft. level, South drift, to air shaft, 40 feet.
100 ft level, North drift, 71 feet.

"*Tubal Cain Mine.*

Main shaft, 146 feet deep.
Air shaft, 50 feet deep.
50 ft. level, North drift, to air shaft, 162 feet.
100 ft. level, South drift, 40 feet.
100 ft. level, North drift, 55 feet.

"*Tubal Cain (hill-side levels).*

107 ft. level tunnel, 200 feet.
220 ft. level tunnel, 90 feet.

"There are a number of other shafts and tunnels, making in all a total of about 2,000 running feet of good working shafts and tunnels.

"The Joshua vein averages about 30 inches in width, and has a dip of about 60°. The ore at the surface consisted of galena, chalcopyrite, pyrite and blende, with traces of gray copper in a white translucent quartz matrix. With depth the ore has gradually changed until gray copper is the predominant ingredient. The gray copper is highly argentiferous, containing about 400 ozs. silver, and 1½ ozs. gold per ton, and will concentrate well, so that the change is a marked improvement. It is reasonable to expect that the ore will continue to increase in richness as greater depth is reached.

"*The King William.*

"This vein is very much of the same nature as the Joshua, the average width being about three feet and pitch about 70°. The ore consists of galena, pyrite, chalcopyrite and blende, in a white translucent quartz. Medium coarse crystalline galena (containing 30 to 40 ozs. silver) at present predominates—very little gray copper yet appearing, but it is probable that this vein will undergo the same change as the Joshua with depth.

"*The Tubal Cain.*

"This vein is somewhat different in nature to the Joshua and King William on the surface—the country rock being more of a calcareous nature. The vein averages about thirty inches in width, and has a pitch of about 70°. It consists principally of a fine crystalline galena running in bands through a rotten ferruginous quartz. A sample of the galena assayed 120 ozs. silver per ton. There has been more or less copper ore in this ledge from the surface, and gray copper is increasing with depth. The ledge has been traced down the hill, and tunnels are being run in from the face of the hill, next to Stump Lake, to tap the main shaft at 100 ft. and 200 ft. levels.

"By building the plant for reducing the ore from these mines close to Stump Lake, and following up the system of tunnels and shafts now commenced, the mines will be opened up in a systematic manner, and afford scope for continuous workings for many years. They will then be able to drain the mines and mine the ore at a remarkably low rate.

"I am inclined to think that the best method of treating the ore from these mines will be to concentrate and ship concentrates to Vancouver or San Francisco. With a series of rolls for crushing and a good concentrating plant, there ought to be no serious difficulty experienced; especially if the percentage of gray copper increases with further development, thereby making higher concentrates.

"The 'Russell process' of lixiviation with sodium and cuprous hyposulphite solution might be applied to the treatment of these ores to advantage.

"Great care should be exercised in deciding upon the best method of treatment, and I would therefore recommend to continue sinking and opening up the mine until the exact nature of the ore to be treated has been thoroughly ascertained.

"*The Star Mine.*

"The Star ledge, also on 'Mineral Hill,' is about the same nature as the Joshua and King William; it averages about 30 inches in width, and has a pitch of about 70°.

"The ore consists of the usual mixture of galena, pyrite, chalcopyrite, and blende, with a little gray copper.

"A shaft is down over a hundred feet, with a number of drifts.

"The Star, Joshua, King William, Tubal Cain, Gentle Annie, &c., form a cluster of veins running more or less into one another, and along with cross-veins present a perfect network of mineralized veins. The cross-veins carry very little mineral, as far as I was able to observe.

"All the veins have a casing of one to three feet of a soft calcareous rock heavily studded with pyrite, which, I think, has been formed by calcareous infiltrations from the country rock. It contains no precious metals.

"Messrs. Henderson and Patterson are the owners of the 'Star' mine; also the 'Planet.' They have erected a small concentrating plant, consisting of a 'Blake ore breaker,' a 'Kendall roller pulverizer,' and two 'Triumph concentrators,' with suitable boiler and engine to drive them. About sixteen tons of concentrates have been shipped to San Francisco, realizing about $75 per ton.

"The works are on rather too small a scale to be remunerative—they will answer a good purpose in the way of experimental work to ascertain the best method of treating the ore. I am of the opinion that a set of two or even three pair of 'Krom rolls,' with suitable screens, would answer best for powdering the ore. The quartz matrix being so very hard, an ordinary pulverizer will hardly answer, as the hard quartz grinds the softer minerals into an impalpable powder, which is lost in concentrating (sliming badly).

"Rolls crush with a minimum amount of grinding, the soft mineralized portion being separated from the quartz by screening after passing through the rolls. Rolls are taking the place of stamps in quite a number of large mills, being found to answer better, and are more economical.

"*The Mary Reynolds.*

"The Mary Reynolds' is one of a group of claims owned by Messrs. Hepburn and Wilson, and located on what is known as Idaho Mountain, which rises about 1,000 feet above Stump Lake.

"The vein is about three feet in width, running about north-west to south-east, and is well defined, with a pitch of about 70°. Some very fine ore has been taken from this mine, assaying 400 ounces in silver and three-quarters of an ounce in gold. I took a sample from an outcropping on this ledge, just under the 'grass roots,' which assayed 182 ounces silver and four-tenths of an ounce gold.

"There is a shaft down about 100 feet, with drifts at the 50-foot level running about 40 feet north and south on the ledge.

"A large number of claims have been staked off on Idaho Mountain, notably the 'Dunsmuir,' 'Nip and Tuck,' 'Gold Cup,' the 'Fletcher' claims, etc., upon which more or less work has been done, demonstrating that a large number of veins traverse the mountain in all directions.

"*The Jennie Long*

"The 'Jennie Long' is owned by Messrs. Dr. Jones, Grant, Moss and others, of Victoria, and located about two miles south-east of the Joshua, and running in about the same direction. The vein averages about three feet in width, upon which a shaft has been sunk about 70 feet. A small quantity of very rich ore has been taken from this ledge, assaying over $3,000 per ton in gold and silver. The vein has about the same characteristics as the other veins of the Nicola Valley, previously described.

"A large number of other claims have been taken up throughout the Nicola country, showing out-croppings of mineralized veins, but not sufficiently developed to be of special notice.

"The country rock of Mineral Hill is a green crystalline rock of a dioritic nature. It varies considerably, graduating into dioritic slate and diabase. In places it is somewhat porphyritic. The country rock of Idaho Mountain approaches a syenyte. Outcroppings of rock of a dolomitic nature were found in several places. The rocks of both Mineral Hill and Idaho Mountain carry considerable calcite and pyrite.

"I was pleased to see the business-like method adopted at the Nicola mines, as I may state that much of the distrust that exists in the Province in regard to mining as a legitimate field for investment has arisen very largely from the lack of business principles in its prosecution. A great many of the misfortunes that have attended mining ventures in the Province have been brought about from a too eager desire to turn the newly found treasures into bullion—mills and machinery being purchased and erected before the existence of a sufficient quantity of paying ore has been definitely ascertained. As so much of this haphazard mining has been done in the past, and since mining men are proverbially sanguine, I deem it important to call their attention particulary to this danger, which must be patent to everyone who has followed the mining history of this Province. There is also the possibility (if not probability) of the ore changing its nature, so that milling plant intended to treat the ore on the surface may become useless on account of not being adapted to treat its altered condition. Sinking and drifting are necessary, and must be done sooner or later to open up the mine and put it in working condition. Why run the great danger of having a mill on your hands with no grist to grind?

"LILLOOET DISTRICT.

"The town of Lillooet is situated upon a plateau of the Fraser river, snugly lying under the lea of high, abrupt, mountains, reminding one of the town of Helena, with the mighty Fraser rolling past, instead of a national highway. Mine host, Mr. Allen, M. P. P., was on hand to receive us. He was quite enthusiastic over the merits of their little town under the hills, and shewed us some splendid fruit and vegetables that were raised there under the genial influence of their beautiful climate and irrigation. It is, indeed, a charming location, and all that it requires is commercial life and enterprise, which will, no doubt, come in due time through the development of the mineral wealth of the surrounding country.

"The Bonanza Ledge.

"The Bonanza ledge is about eight miles from Lillooet and is reached by a trail along Cayoosh Creek through a wild, picturesque country, the rugged mountains standing out in bold relief. In contradistinction to the appearance of the Nicola country, it did not look 'too nice' for a mineral region. That noble bachelor element, gold, has the characteristic of wandering off by himself to some lonely, almost inaccessible locality. The ledge lies on the edge of a horseback or ridge, rising up from the creek on an incline of about 50°, the opposite bank being a precipitous bluff fully 2,000 feet high.

"Most of the work that has been done on the ledge is on an outcropping about 1,200 feet above the level of Cayoosh Creek, a shaft having been put down a depth of 50 feet. The vein at this point has been very much contorted—pitching with a heavy curve towards the side of the ridge. The vein is about 30 inches in width of a crystalline quartz, with a slight ferruginous coloring, having a 'kindly' appearance. Towards the edges of the vein schistose slate is intermingled with the quartz. The country rock is a black argillaceous slate, graduating in places into talcose slate. In proximity to the vein the cleavage planes of the slate are very much curved and contorted and more schistose, shewing considerable metamorphism. Outcroppings of the ledge are to be seen along the ridge in many places, and the vein can thus be traced for a long distance up the mountain, running about north-west to south-east.

"A side-hill cutting has been made on a vein down near the creek, exposing a mixture of quartz, slate, earthy gangue, and a schistose slate containing arsenopyrite (mispickel). This vein appears to run magnetic north and south, and it is hardly probable that it can be a continuation of the Bonanza ledge proper. A large dyke, about 100 feet wide, cuts across the ridge between the upper and lower locations, which was most likely instrumental in forming these veins. Extensive igneous eruptions have no doubt taken place in this locality, as a great many large dykes can be plainly seen cutting the mountains in all directions. No doubt igneous eruptions, forming dykes, are instrumental in producing fissures and creating heat, and thereby favourable conditions for vein formation, and metalliferous veins are of more frequent occurrence in the neighbourhood of eruptive rocks.

"It would be interesting to trace the association of the numerous dykes and veins in this region. Every man in that section has one or more quartz ledges staked off, carrying more or less gold.

"The richest portion of the Bonanza ledge is where the schistose slate and quartz are intermingled, next to both the hanging and foot walls. The schistose slate, with arsenopyrite, occurring in the lower location invariably carries considerable gold, and I have detected small traces of arsenopyrite accompanying the gold in the upper location.

"The following is a list of assays made of thirty samples taken from the Bonanza claims. Many of the samples are picked, so that the assays would represent rather too high an average:

No.	Description.	Gold. (Valued at $20 ℔ oz.)	Silver.
1	Quartz	$ 36.00	25c.
2	Quartz	3.00	Nil.
3	Slate	38.00	25c.
4	Quartz and Slate	108.00	50c.
5	Slate	90.00	50c.
6	Quartz and Slate	76.00	$2.00
7	Quartz	18.00	Trace.
8	Quartz	Trace.	Nil.
9	Quartz	16.00	Trace.
10	Quartz	14.00	Trace.
11	Quartz	4.00	Nil.
12	Quartz	Trace.	Nil.
13	Quartz and Slate	74.00	50c.
14	Quartz	54.00	Trace.
15	Quartz	22.00	Nil.
16	Quartz and Mispickel and Slate	288.00	$1.25
17	Quartz and Mispickel	34.00	Trace.
18	Quartz and Mispickel	21.00	Trace.
19	Quartz and Mispickel	17.00	Trace.
20	Quartz	7.00	Nil.

		(Valued at $20.70.)	
21	Quartz	$ 4.14	Nil.
22	Quartz	2.07	Nil.
23	Quartz	14.43	Trace.
24	Quartz	24.84	Trace.
25	Quartz	4.14	Nil.
26	Quartz and Slate	22.77	Trace.
27	Slate and Mispickel	42.43	18c.
28	Quartz	Trace.	Nil.
29	Earthy Gangue	Trace.	Nil.
30	Slate and Arsenopyrite	34.15	Trace.

"It would be advisable to do some prospecting on the ledge close to where it is likely to come in contact with the dyke previously mentioned. Whatever work is done should be in the way of sinking down on the vein, doing as little tunneling as possible, as the vein has apparently been considerably twisted.

"There appears to be a weakness among miners for tunnels. In many places throughout the country long expensive tunnels have been driven into the mountain side, before the value of the vein had been in any way demonstrated. By all means stick to the vein until you have proven to some extent what you have got.

"A splendid water power can be obtained from Cayoosh Creek by a flume to a fall just above the ledge at a small expense, with sufficient power to drive any amount of machinery. A road would have to be built along Cayoosh Creek for about six miles, which would be some what expensive, but I think a fairly good road, suitable for the purpose, ought not to cost more than $10,000.

"Just below the Bonanza claim, some enthusiastic miner has built an old-fashioned Mexican arastra, but appears to have become discouraged and left without completing it. The arastra is still used in some parts of Mexico, and answers a good purpose for prospecting under favourable conditions. About a hundred Chinamen were busily engaged placer mining over a distance of four or five miles immediately below the Bonanza claims. The Chinamen have shewn considerable enterprise in building wing-dams, sluices, etc., which are swept away every winter. Notwithstanding their crude methods of operation, and also the fact that bed-rock has not been reached, they have been taking out fully $75,000 per year during the past five years. There is no doubt that if this creek was taken in hand by a few practical miners, with some capital, it would yield big returns. With a comparatively small amount of blasting a bed-rock flume could be run up the bed of the creek, and thus strip the bed-rock of its golden treasures.

"A large number of quartz veins can be seen cropping out along the shores of Seton and Anderson Lakes. A sample taken from a vein on Anderson Lake, for Mr. Pettingell, contained some chalcopyrite, carrying a little silver. A large vein of quartz, containing argentiferous galena, was discovered about ten miles from the north end of Anderson Lake, by Mr. Jensen, last summer. The galena contains about 140 ozs. in silver and an ounce of gold per ton. Some specimens of quartz, with gray copper, rich in silver, have been obtained on Bridge river, also a nugget of native copper. A large vein of native arsenic occurs between Bridge and Fraser rivers.

"From what I can learn, the Bridge river country is a good field for prospectors, as it is well mineralized and comparatively unexplored.

"*Illecillewaet Mines.*

"A very large number of claims have been taken up in the neighbourhood of Illecillewaet, which indicate numerous outcroppings of mineral veins.

"The Lanark mine is the most prominent one at present, having opened up a large body of galena and decomposed ore (carbonates), rich in silver. Four hundred tons of ore have been shipped from the mine during the years 1887 and 1888, bringing, in San Francisco, about $65 per ton. The Lanark mine is owned by the Selkirk Mining and Smelting Company, They are also interested in a number of other claims in the neighbourhood. Mr. Thomas Earle is president, and Mr Geo. A. Sargison secretary, of the company. The company are running in a tunnel this winter, on the four hundred-foot level, and expect to reach the ore body by spring, when it is the intention of the company to build a tramway to transport the ore to the railway, thereby reducing the cost to a minimum, the expense of packing the ore down the mountain side on mules' backs being very heavy. The average of a large number of assays of

galena taken from this mine is about 70 oz. in silver. Some samples have gone as high as 120 oz. of silver per ton.

"The ore formation of the veins in the neighbourhood of Illecillewaet consist principally of galena and oxidized ore, containing more or less gray copper, chalcopyrite, pyrite, and blende, in quartz and calcite.

"The veins, as a rule, run parallel to the strike of the country rock of the district, which consists of calcareous slates and limestone. The veins may therefore be regarded as 'segregated veins,' or, as the miners call them, 'blanket lodes.'

"It was at one time thought that segregated veins were not to be trusted, but some of the most productive mines in the world have been segregated veins. The only fault that can be found against them is that they are more liable to pinch out than true fissure veins, when occurring in limestone.

"I am informed that the 'Jumbo,' belonging to Messrs. Corbin, Kennedy & Co., cuts across the stratification of the country. It is well defined, and a very promising ledge, consisting of quartz containing galena and pyrite, and will concentrate about twenty to one. An assay of the concentrates went 316 oz. in silver.

"Some very fine argentiferous gray copper ore (freibergite) was taken out of the Isabella mine last year, samples of this mineral having assayed as high as 2,600 oz. in silver per ton. Argentiferous galena will no doubt be the principal output of the Illecillewaet mines.

"Most of the mines will require a concentrating plant, as the galena although occurring in large masses, is more or less disseminated through the quartz and calcareous gangue. The average of a large number of assays of galena from this locality is 66½ oz. in silver, the lowest being 32 oz., and the highest 120 oz. silver, per ton.

"I have prepared a tabulated list of the various minerals, which have been found in different parts of the Province, that have authentically come under my notice. I would be pleased to receive a sample of any mineral not included in this list, giving locality, etc., for future additions.

"Every country has its individuality in the way of characteristic minerals, with which a prospector should endeavour to become familiar, as it will be of service in his explorations and estimation of the probable value of any vein he may discover. I trust the following list of minerals, and notes on gold and silver ores, may be useful in that direction, and answer as a commencement towards a systematic arrangement of definite information on the minerals of the Province.

List of economic minerals found in the Province.

"IRON ORES.

"*Magnetite.*

"Very abundant; found in large deposits on Texada Island; also in considerable quantity at Sooke, Kamloops Lake, Nicomin, etc. Occurs, peculiarly intermingled with pyrite, at Burrard Inlet and Skeena River.

"*Hematite.*

"Not yet found in any large quantity; found in association with magnetite at Sooke and Texada Island. A small body of red ochre occurs at Texada Island. Small quantities of micaceous variety found at Nicola, Toad Mountain, and Burrard Inlet. Large nodules of clay iron stone occur with the coal beds of Queen Charlotte and Vancouver Islands.

"*Pyrite (Iron Pyrites).*

"Very abundant. Found everywhere throughout the Province, carrying more or less gold. Auriferous pyrite localities—Rock Creek, Cariboo, Big Slide (near Clinton), Kootenay.

"*Marcasite (White Iron Pyrites).*

"Occasionally met with.

"*Pyrrhotite (Magnetic Pyrites).*

"Abundant. Localities—Illecillewaet, Big Slide, Salt Spring Island, Westminster District.

"*Arsenopyrite (Mispickel).*

"Abundant. Frequently found in gold-bearing quartz. Localities—Cayoosh Creek Kootenay, Queen Charlotte Island.

"*Menaccanite (Titaniferous Iron Ore).*

"Somewhat rare. Localities—Skeena River, Texada Island.

"*Siderite*

Occurs in magnetic iron ore, Texada Island.

"COPPER ORES.

"*Native Copper.*

"Rounded pieces have been found at Omineca, Fraser, Bridge, Thompson, Similkameen, and Quesnelle Rivers, and Keithley Creek. Native copper occurs at Sooke, V. I., in small flakes, disseminated through a hornblendic rock.

"*Chalcopyrite (Yellow Copper).*

"Very abundant. Occurs in small quantities in a great many places. Usually carries a little silver. Notable localities—Howe Sound, Texada Island, Queen Charlotte Island, Nicola, Toad Mountain (42 oz. silver), Salt Spring Island, Sooke, Barclay Sound.

"*Bornite (Peacock Copper).*

"Frequent occurrence. Invariably contains some silver. Localities—Toad Mountain, Howe Sound, Texada Island, Queen Charlotte Island, Jarvis Inlet, Homathco River.

"*Chalcocite (Copper Glance).*

"Not uncommon. Locality—Jubilee Mountain (in heavy spar), Toad Mountain.

"*Tetrahedrite (Gray Copper).*

"Abundant. Invariably carries silver. Localities—Illecillewaet, Kootenay, Nicola, Toad Mountain, Bridge River, Hope, Cherry Creek.

"*Cuprite.*

"Rare. Locality—Cassiar.

"*Azurite.*

"Common. Localities—Nicola, Jubilee Mountain, Illecillewaet.
"Malachite is occasionally met with in copper veins.

"ANTIMONY ORES.

"*Stibnite.*

"Somewhat rare. Locality—near Lytton.

"*Arsenical Antimony (likely Allemontite).*

"Rare. Locality—Queen Charlotte Island.

"ARSENIC ORES.

"*Native Arsenic.*

"Abundant. Occurs in small seams, generally in calcite. Localities—between Bridge and Fraser Rivers, Kokesailah River, Queen Charlotte Island.

"*Cobalt and Nickel.*

"Traces found in some of the gray copper or fahl ores. Some nickeliferous sand has been found in alluvial gold from the Fraser River.

"LEAD ORES.

"*Galena.*

"Very abundant Occurs in both limestone and quartz, but favouring quartz. It is invariably argentiferous, carrying from 2 oz. up to 300 oz. in silver—usually from 50 to 70 oz. Notable localities—Illecillewaet, Kootenay, Nicola, Rock Creek, Similkameen, Omineca, etc.

"MANGANESE ORES.

"*Wad (Bog Manganese).*

"Somewhat rare. Locality—Nicola.

"MERCURY ORES.

"*Native Mercury.*

"Rare. Locality—Fraser River, near Clinton.

"*Cinnabar.*

"Rare. Locality—Kicking Horse, near Golden (in calcite), Fraser River (doubtful), Homathco River

"*Arquerite.*

"Rare. Locality—Vitalle Creek, Cassiar. Small quantities have been found in several other creeks. Contains about 85 % silver.

"ZINC ORES.

"*Sphalerite (Blende).*

"Very common. Found in variable quantities in nearly all silver-bearing veins, but is generally very poor in silver. Localities—Illecillewaet, Nicola, Cherry Creek, Texada Island, Kootenay, Burrard Inlet, etc.

"MISCELLANEOUS MINERALS.

"*Molybdenite.*

"Abundant. Often found in copper veins. Localities—Howe Sound, Anderson Lake, Kittimaht (N. W. Coast), Texada Island, Jarvis Inlet, Cowichan River.

"*Barite (Heavy Spar).*

"Common. Localities—Jubilee Mountain (large body containing lumps of copper glance), Nicola, Queen Charlotte Island.

"*Mica.*

"Common. Found in good-sized sheets in Horsefly country and Clearwater River.

"*Asbestus.*

"Abundant. Found in small seams in a number of places. Localities—Similkameen (good quality), Kootenay, Stuart River.

"*Platinum.*

"Abundant. Found in small particles in the Similkameen, Tranquille and Fraser Rivers; principal locality, Granite Creek, from which about 4,000 oz. of native platinum has been taken since 1885, in working for alluvial gold.

"Osmiridium and chromite are associated with the native platinum, which contains about 70 % platinum, with some rhodium, iridium, copper, and iron, and traces of palladium.

"*Bismuthinite*

Occurs in small veins of quartz on the Little Shuswap Lake.

"*Chalcedony.*

"Pieces of chalcedony are plentiful on the shore of Kamloops Lake and Queen Charlotte Island (sea shore).

"*Celestite.*

"A very good sample was found during the past year—locality not yet known.

"*Native Alum.*

"Small deposits have been found near Harrison and Anderson Lakes.

"GOLD AND SILVER ORES.

"It is well-known that gold is to be found in almost every stream in the Province. The reports of the Gold Commissioners contain a detailed statement of the product of the different streams in their respective districts. Gold-bearing ledges have been discovered in every mining district in the Province, the most important districts being Cariboo, Kootenay, Rock Creek, and Lillooet.

"A number of free gold quartz ledges have been discovered, but the majority contain more or less pyrite or arsenopyrite—the rock of the whole country being very heavily charged with iron sulphurets.

"Many of the so-called free gold ledges are only the ferruginous cappings (gossan) or outcroppings of metalliferous veins which have undergone decomposition or oxidation by the action of moisture and atmospheric forces, the sulphurets of iron being changed into the hydrated oxide of iron. This surface alteration of the vein does not extend below the water or drainage level of the country. In this Province it does not, as a rule, extend very deep, generally not more than ten or twelve feet.

"The Government testing mill, now in course of erection at Cariboo, will, no doubt, furnish interesting results regarding the yield of the gold-bearing ledges of Cariboo, which contain, for the most part, a large percentage of sulphurets.

"It is somewhat premature to lay down any rules or observations regarding the mineral characteristics of this Province, owing to its not being sufficiently developed, but I may state with regard to silver-bearing veins that there is a marked similarity between the ore formation in the different mining sections of the country. There is a general rule of association of the various minerals contained in metalliferous veins which is most likely due to the solubility of the minerals in the same menstruum. The association of minerals or typical ore formation, which represents the characteristic features of almost all the silver-bearing veins in the Province, consists of galena, pyrite, chalcopyrite, and blende, with more or less argentiferous gray copper in a quartz matrix. This class of vein, although not uncommon in other mineral countries, is strikingly characteristic—being found in almost every part of the Province, and which supports the theory that certain processes of formation have been common to every period in its geological record.

"Galena is the principal mineral or matrix for silver, and will no doubt be the source from which the great bulk of the silver yield of the Province will be obtained. It is usually highly argentiferous, running from 2 ozs. to 300 ozs. in silver per ton, the average throughout the Province being about 60 ozs. silver per ton. The galena, as a rule, is comparatively coarse grained, and generally in a quartz matrix. The old idea that fine-grained galena carried the most silver does not hold good respecting the galena of this country. On the contrary, the rule is reversed—the coarse-grained galena generally being the richest. The fine-grained galenas often carry some antimony—the fineness being due to the presence of that metal.

"Argentiferous tetrahedrite, commonly known amongst the miners as 'gray copper,' comes next to galena in importance as a silver bearing mineral, being found in nearly all the mining sections of the Province. It is invariably rich in silver, running from 400 ozs. to 3,000 ozs. in silver per ton. In the Nicola District it averages about 400 ozs. in silver. In the Kootenay, including Illecillewaet District, it averages about 1,000 ozs. in silver. It occurs in small specks disseminated throughout the quartz, also in lumps enclosed in galena, and in ribbon veins. Owing to its scattered or spotty nature in the gangue of the vein, and its intermittent occurrence, the miners have not much confidence in it as a good indication, but I am inclined to think they are passing judgment too hastily. In the Joshua mine, at Nicola, it is the principal source of silver at a depth of nearly three hundred feet—the surface ore being principally galena.

"Gray copper ore occasionally graduates into a polybasite, which may, for the sake of distinction, be better termed argentiferous fahl ore in some of the mines, a good sample of which was obtained from the Hall Bros. mine at Toad Mountain, containing copper, antimony, arsenic, iron, zinc, silver, sulphur and traces of cobalt and nickel.

"Peacock copper ore (erubescite) occurs frequently throughout the Province, carrying from 30 ozs. to 50 ozs. in silver per ton. A sample from Toad Mountain assayed nearly 500 ozs. in silver, but I think this high assay was due to fine threads of very rich copper silver glance contained in it.

"Small ribbons of copper silver glance, occurring at Toad Mountain, go as high as 5,000 ozs. in silver. Copper glance occurs in barite (heavy spar) at Jubilee Mountain and Queen Charlotte Island, but it is rather poor in silver, carrying only about 10 ozs. in silver. Yellow copper (chalcopyrite) usually carries a little silver (from 5 to 40 ozs.)

"A sample of specular iron from Illecillewaet District went 90 ozs. in silver. Native wire silver has been reported as occurring at the 'Krao' mine, Kootenay Lake. Small nuggets of native silver have been found in the following creeks:—Similkameen, Forty-Mile, Granite, Wild Horse, Mission, and North Fork Stickeen. Considerable Arquerite has been obtained in Vitalle Creek, Cassiar.

"In conclusion, I take this opportunity to state that the samples sent from different parts of the Province for assay are invariably too small to give satisfactory returns. High assays obtained from 'pet samples' are altogether misleading, and are calculated to destroy confidence in assaying as a means of ascertaining the richness of a vein. For a surface prospect an assay is just as satisfactory as a milling test, since a proper assay for gold and silver gives remarkably accurate results—the whole difficulty lying in improper or careless sampling. I would suggest that a stipulation be made, requiring not less than one pound samples for assay.

"I have, &c.,

"*Hon. John Robson,* (Signed) "WILLIAM J. SUTTON."
"*Minister of Mines.*"

———o———

COAL.

The following table shows the output of each year from 1874 to 1888, inclusive:—

Year.	No. o Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070
1885	365,000
1886	326,636
1887	413,360
1888	489,300

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.
"4th February, 1889.

"SIR,—I have the honour, in compliance with the provisions of the 'Coal Mines Regulation Act, 1877,' to respectfully submit my annual report, as Inspector of Mines, for the year 1888, for your consideration.

"During the year 1888, coal mining has been carried on in the following Collieries:—
"Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.
"Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons.
"East Wellington Colliery of the East Wellington Coal Co.
"Union Colliery, the property of the Union Colliery Co.

"The output of coal for the year ending 31st December, 1888, amounted to 489,301 tons, as follows:—

Nanaimo Colliery output	258,817	tons.
Wellington Colliery "	198,392	"
East Wellington Colliery "	30,092	"
Union Colliery "	2,000	"
Total output in the year 1888	489,301	"
Add coal on hand 1st January, 1888	2,899	"
Total coal for disposal in 1888	492,200	"

"The coal exported in 1888, amounted to 365,714 tons, viz. :—

Nanaimo Colliery export	215,252	tons.
Wellington Colliery "	124,649	"
East Wellington Colliery "	25,813	"
Total exported in 1888	365,714	"
Add home consumption in 1888	115,953	"
On hand 1st January, 1889	10,533	"
	492,200	"

"The exports were chiefly to ports in California, viz. :—San Francisco, Wilmington, and San Diego ; and sundry cargoes were shipped to Seattle, (W. T.) ; Portland, Oregon ; Alaska ; Petropavloski ; Hawaiian Islands ; China and Japan (per C. P. R. steamers). Coal has also been supplied to H. M. Navy, and U. S. War and Revenue vessels, and also to ocean mail steamers and other vessels calling for fuel.

"In the year 1888, there was an encouraging increase in both output and exports over the previous years' results, as exhibited by the following table, viz :—

	Output.	Export.
1884	394,070 tons.	306,478 tons.
1885	365,596 "	237,797 "
1886	326,636 "	249,205 "
1887	413,360 "	334,839 "
1888	489,300 "	365,714 "

"The coal denoted as 'home consumption,' includes coal used in the collieries, and is returned as 115,953 tons as compared with 99,215 tons returned under that head in 1887.

"The following statement shows the sources from which the State of California, our principal market, is supplied :—

	1884. Tons.	1885. Tons.	1886. Tons.	1887. Tons.	1888. Tons.
British Columbia, including 64,395 tons to Wilmington and San Diego in 1887, and 48,932 tons in 1888	291,546	224,298	253,819	324,949	345,681*
Australia	190,497	206,751	287,293	155,649	271,612
England and Wales	108,808	170,656	160,869	91,248	126,167
Scotland	21,143	20,228	19,795	12,615	10,680
Eastern States (Anthracite, &c.)	38,124	29,834	19,517	24,102	30,118
Seattle	125,000	75,112	57,552	199,079	568,948†
Carbon Hill	122,060	157,241	124,527	179,526	
Green River, Cedar River, &c.	77,485	71,615	90,664	121,791	
Renton, Newport and South Prairie	60,413	67,604	73,654	69,314	
Coos Bay	.....	.....	.....	.....	47,015
Japan	.....	.....	.....	.....	13,808
	1,035,076	1,023,339	1,087,690	1,178,273	1,414,029

*These totals represent the quantity of coal *actually received* in San Francisco and other Ports in California, during the respective years.

† Total from Puget Sound Collieries in 1888.

"It must be noted that the above statement, excepting in the case of British Columbai, does not state the quantity of coal received in Wilmington and San Diego in 1887 or 1888. For the year 1887 the coal entered at these two ports was estimated at from 175,000 to 200,000 tons, which added to the total of 1,178,273 tons in the statement, showed the State of California to be a customer for coal in 1887 to the amount of upwards of 1,300,000 tons. Now, in 1888, it is said by a recognized commercial authority, that quite as much as 200,000 tons were received in Wilmington and San Diego direct from the mines, by the sea ; and this amount, less the receipts at these two ports from this Province—say 48,932 tons—added to 1,414,029 tons, the total for 1888 in the above statement, makes 1,565,097 tons as the amount of coal absorbed by California in 1888 for her manufacturing, domestic and steamship purposes, or the remarkable increase of 265,097 tons above the consumption in that State in the year

1887, without taking into calculation sundry receipts of coal at San Francisco from Utah, Colorado and Wyoming Territories during the last half of the year.

"The increased demand for coal and the satisfactory price which our excellent product has realized in the market during the year 1888, have greatly enhanced the prosperity of the coal industry of Nanaimo, Wellington, and Comox, where, as will be seen by the returns appended to this report, upwards of 2,000 men are constantly working in and about the coal mines, a large number of whom have families and homes of their own, and are, to all appearances, contented, prosperous and permanent settlers in the Province.

"NANAIMO COLLIERY.

"The coal in this colliery, as in all other collieries in this district, has been in good demand during the past year.

"No. 1 Pit, Esplanade, in Nanaimo.

"This mine, forming part of the Nanaimo Colliery, belongs to the Vancouver Coal Mining and Land Company, Limited. The working places in the mine have not been as extensive or prosperous of late as may be wished, yet there has been a considerable quantity of coal taken out, some of it from the No. 1 North Level; but the greater portion came from the part which is known as the No. 3 North Level. In the No. 1 Level a drift has been made for a long distance without any coal, until during the last few months, when coal was got into, which is good but not as thick as the seam generally is, although it is improving in thickness. In the No. 3 North Level there appears to be a good prospect for coal on this, the year on which we have now entered, having also passed through a fault.

"Ventilation in this pit is very good. There is little or no gas now found in the working places of the mine. The motive power of this ventilation is a Murphy's fan. The Company have a duplicate of the fan which was destroyed by fire on that memorable explosion, but it has not yet been erected. This mine is free from dust, and there is a regular system of pipes by which water may be led to any place where it may be needed.

"No. 3 Pit (Chase River).

"This shaft has been mentioned in a previous report. It is situated near the mouth of Chase River, about two and a half miles south of Nanaimo, and belongs to the Nanaimo Colliery of the Vancouver Coal Mining and Land Company, Limited. The coal in this mine has been and is at present of very good quality, and hard, although varying in thickness from three to nine feet. All the working is by a slope, starting from near to the bottom of the shaft and going to the dip. The system of working is that of the pillar and stall. You will see by my former report that the Company were sinking a second shaft, which was to be in connection with this mine. That second shaft was put down and connected with No. 3 Pit early in the year, and now this second shaft is the upcast or return way for the air to the surface.

"Ventilation is good; motive power, a fan on what is now called the upcast shaft. Since this fan has been working I generally found 38,000 cubic feet of air passing per minute, for the use of forty-five men and seven mules, and well conducted into the face with brattice or otherwise. This mine has been free from gas since it started, and also free from dust. Everything is kept in good order. In this mine, as well as in all the mines belonging to this Company, the workmen send a deputation of men chosen from among themselves to examine the mine, under section 46, General Rule 31, of the 'Coal Mines Regulation Act, 1877.' The finding of the condition of the mine is recorded in a book kept for that purpose, so that all may see it and know the condition of the workings.

"South Field Mines, Nos. 1 and 2.

"These mines, which used to be separate mines, may now be classed as one, as they are both connected and working into each other. During the past few months some coal has been taken out of what was known as the No. 1 mine, from along the outcrop, but the great bulk

of coal came out of the No. 2 mine. Both of these mines are worked by way of slope from the surface. No. 2 is down about 700 yards, with an easy grade until near the face, where the pitch of the coal is greater. This has been, and is now, a valuable mine, and for months back the company have been getting out of it over 600 tons of coal per day. At present they are working four levels—two to the east and two to the west side of the slope. The coal keeps good, although some of it is not very thick.

"Ventilation is excellent,—motive power, a large fan on the top of the upcast shaft. This mine is ventilated on the separate split system. There are three divisions—one to the west and two on the east side. The upper part of the east side is aired by No. 1 mine as the intake; the west and the lower level on the east side is aired by the No. 2 slope, and, after leaving the No. 2 slope, it ascends till it comes out of the fan. This mine gives off some gas, but, with ordinary care, there is not any danger. The current of air, when I tested it in December, was 52,000 cubic feet per minute for the use of 140 men. This mine is free from dust, the floor being wet throughout.

"The principal output of coal by the Vancouver Coal Company during the past year has been from this mine, with workings to the east and west sides of the slope.

"A selected deputation of workmen (under Section 46, General Rule 31) examines every part of the mine once a month. This puts them in a position to know the condition of the workings of the mine, and to judge as to its safety for themselves. The results of such examinations are recorded in a book kept for that purpose, and left open for any one to inspect, so that it is useful for both manager and workmen.

"No. 4, South Field Mine.

"This is a new slope, forming part of the Nanaimo Colliery. This slope starts at the surface, about half a mile in a southerly direction from No. 3 pit, and on the side of the railway of the No. 1 and 2 mines, which are about a mile and a half south of this No. 4 slope. This slope is now down about 300 yards, with a counter slope as a return airway. The coal has been very thin for the most of the distance, and in some places there was none. From the west side of the slope a level has been started, and is now drifted in about 40 yards into good saleable coal, and as the workings of No. 3 pit, coming towards this level, are in good hard coal—8 feet thick in some places—it may reasonably be expected that the coal reached in this level is a continuation of the same coal, and they are looking for the slope to get into it soon.

"WELLINGTON COLLIERY.

"This colliery belongs to Messrs. Robert Dunsmuir & Sons, and is situated in Mountain and Wellington Districts.

"Wellington Mine and Adit Level.

"Work was done in this mine for a short time only, and in the adit at the beginning of the past year. Both of those places are stopped for the present, but at some future time there may be some coal extracted along the outcrop.

"No. 3 Pit, Wellington Colliery.

"This is the shaft worked in the valley of the Millstream River, with the fan-shaft as upcast, and is the only mine worked in this valley by Messrs. Robert Dunsmuir & Sons. As I have before mentioned in previous reports, all the workings of this mine are by way of a slope starting about 70 yards south from the bottom of the shaft. The coal is worked here on the pillar and stall system, which is the general plan of working in this colliery—large pillars (of coal) are left, being nearly two-thirds of the bulk of the coal. The coal in this mine has been and is very good in quality and hard, as is the usual character of Wellington coal. The mines have been worked steadily most of the year, there not having been anything out of the regular course here to cause any delay. The coal is worked from six feet to eleven feet high, hard and good, leaving a coal roof overhead.

"Ventilation, good. When I was down in December I found, on testing it, that there were 35,000 cubic feet of air passing per minute, besides a large quantity of air which came in from the No. 4 Pit at different places that it would be difficult to get measured; the above-mentioned air being for the use of 77 men and 15 mules. This mine is ventilated on the separate split system, one on the south side and two main divisions to the north side of the slope; the stall furthest away in each division getting the air first, then returning by way of the working places and old works to the upcast shaft. The motive power is a large fan with an engine of considerable power on each side of the fan. This being the first ventilating fan that was erected in the district, has been almost constantly worked during the past eight years. Messrs. Robert Dunsmuir & Sons were so satisfied with the result of the working of this fan that in opening all their other mines they made preparations for the use of ventilating fans There is now very little gas in this mine. Everything in and about the mine is kept in good order, and nothing is spared that may be wanted for the successful working of a mine. There, as in the other extensive mines of the Wellington Colliery, the workmen send a deputation from those employed in the mine every month to examine every part of the mine, they being furnished with all things that may be necessary to make a complete examination of the workings (see section 46, General Rule 31). This examination places those employed in the mine in a position to know the condition of the mine, as to its safety, etc. The results of the examinations are recorded in a book, which is open for reference by any one wishing to see it.

"No. 4 PIT, WELLINGTON COLLIERY.

"This pit is put down on the top of a high bluff which overlooks the Millstream Valley. Mining here is carried on very extensively by Messrs. Dunsmuir & Sons. Here, as in No. 3 Pit, they have been working steadily during the greater part of the year, excepting when they had to lay off for a day or two for necessary repairs and to render assistance during the casualty in No. 5 Pit.

"The coal is worked from what are known as the north and south side workings. All the workings of the mine are on the pillar and stall principle, except a small place on the south side where they are now opening out to the long-wall system. The coal in this mine is very good, but not so difficult to get out on the north as on the south side Although the coal has been good, yet they have had considerable trouble with faults of one kind and another.

"This mine is connected in different places with the workings of the No. 3 Pit. If required those places could be taken advantage of at any time; besides these connections they have their fan-shaft by which the men could be taken out if emergency required it.

"Ventilation is good,—motive, a large fan on the top of the upcast shaft, kept constantly running by a powerful steam engine. This mine is also ventilated on the separate split system; the two main divisions are at the bottom of the shaft, to the north and south sides, and in the north side it is again divided further in in the workings. The workings of this mine are spread out over a great area, but the air is kept well under the control of the overman, so that it cannot steal away to one district, leaving the other wanting. All the different divisions are well ventilated, so that after the air has gone round its several districts, it all gets into one body again near the bottom of the upcast shaft. When I was down, in December, I found the current of air travelling on the return to be 1,200 feet per minute, passing 92,400 cubic feet of air, which was for the use of 180 men and 14 mules. This mine gives off some gas, particularly where the pillars are taken out; it comes from the roof, but it is well looked after and gets no chance to collect. The fireman seldom finds any in the stalls. Everything is kept in good order, no expense being spared to make the works safe and keep the mine in good condition and working order. This mine is not dusty, as there is a regular system of pipes put in the workings wherever it is thought that water may be required for the laying of dust, as well as to provide a means of extinguishing fire in case a fire should break out in the workings. They can have water at most of the places in a short time.

"In addition to the fireman and shot-lighters (who are travelling through the mine all the day) the miners taking out pillars are also furnished with safety lamps, so that at any time when, or, if a cave should take place (fall from the roof) they, in the absence of either the fireman or shot-lighter, may make an examination with the safety lamp to ascertain if the place is safe or otherwise. In this mine also the mine is examined monthly by a deputation of the workmen in the manner before described.

"No. 5 PIT, WELLINGTON COLLIERY.

"This is the pit belonging to Messrs. Robert Dunsmuir & Sons, to which there is a branch line from the Esquimalt and Nanaimo Railway, so that the railway company's locomotives go under the shute at the pit for their own supply of coal. From this pit also trains of cars loaded with coal are dispatched to Victoria.

"In this mine all things went on as usual, until the 24th January of last year, when the workmen on the surface became suddenly aware that a terrible explosion had taken place in the mine, where 168 men were then engaged below. The working of the hoisting cage was stopped by the force of the explosion, and nothing was heard from any person below for quite a time after. The covering of the fan-shaft was also broken. This was, however, with all speed temporarily repaired and the fan kept running to its full speed, so that where it was possible, pure air might be got in to the workings, until such time as help could go down from the top.

"After a communication was got with those below, it was encouraging to know that there were a great many men in the bottom waiting to be taken up, and this was done after an unavoidable delay of nearly three hours. As the men came up enquiry was made as to where the explosion had taken place, but no one could tell. There were men brought up that came from the slope and the west side, but none of the men from the east side came up, and nothing was known about them. As none of the men that worked in the east level were sent up, it was certain that that was the place or division of the mine in which the explosion had taken place. This conclusion, afterwards, proved too true, as after all the men that were in bottom of the shalt were got out to the number of 91 (ninety-one), there were yet 31 (thirty-one) white men and 46 Chinese missing, and from the condition of the ventilation of the mine it was plain that it was not possible for any of the men in the east side or level to be got out alive, but at the same time there was no want of men to go down to see if they could get some out; not one, however, of those that were in the east level was left alive to tell the tale. There was only one injured got out, and he was near the bottom of the shaft.

"As it was impossible to get far into the workings, owing to the after damp being so strong, air had to be taken in as we went along, and the bodies got out as they could be got at; so that by noon of 26th January, the bodies of all the white men and of 37 Chinese were got out, leaving yet 9 Chinese to be accounted for, and those were got out from time to time as the mine was cleaned up, when on the 9th day of May the last body was got out, making 77 deaths; and, in my opinion, it was owing to their being able to keep the fan running, which kept the after-damp from the downcast shaft, that the 91 men who were got out alive were saved.

"As I have observed, previous to the explosion everything in and about the mine was in good order, nothing seemed lacking. The ventilation was very good; at the time when I was down, previous to the explosion, there were 86,610 cubic feet of air passing in the mine for 175 men and 9 mules; and of this volume of air, 45,400 cubic feet per minute were going in the east side, which includes the slope.

"This mine, before the explosion, was the best ventilated mine in the district, the air at no place having far to travel until it was on the return for the fan-shaft, and the airway being very large.

"After the public inquiry that has been made into that terrible accident, conducted by Mr. Taylor for the Crown, and by Mr. Pooley for Messrs. Dunsmuir & Sons, the evidence and result of which was published at the time, I do not think I can do better than refer you to the record of the inquisition filed in the Department of the Honourable Attorney-General, in case it should be desired to obtain further details of the lamentable occurrence.

"In this No. 5 Pit, a start was again made about the middle of February to take out coal on the west side, and at the same time work was done towards placing the east level in order, so that those wishing to work might have a chance.

"I have been through all the works in this mine, frequently, since the explosion, both with a safety lamp and without one, and since the airways were put in proper order (after the explosion) I have never seen gas burn in the safety lamp.

"Ventilation is good, and well conducted into the face by a brattice or otherwise, and well around the caves where pillars have been taken out. When I went down, on the 22nd December, I found 106,000 cubic feet of air per minute passing, for the use of 170 men and 13 mules. This mine is free from dust, and no expense is spared to keep it so. They have an adequate system of water works, or pipes, to take water to any place in the mine where

it may be required. The mains are along the levels and main roads, with small pipes to the stalls. Sprays of water are blown off here and there throughout the mine, and the air carries the moisture along, so that everywhere it is not only damp but wet. The water is supplied from a large reservoir on the surface, therefore the pressure is the depth of the shaft, 260 feet.

"This mine is examined monthly by a deputation from the miners employed here, under the provisions of the section and rule to which I have drawn attention, the result being posted up on the pit head, as well as entered in a record book, so that all may see it.

"No. 6 SINKING SHAFT, WELLINGTON COLLIERY.

"Messrs. Robert Dunsmuir & Sons have started to put down another shaft, to be known as No. 6 Pit. This shaft is fully 900 yards east of No. 4 Pit, and is not far from the No. 2 East Wellington Pit. The No. 6 Pit is now down 170 feet, and will have to go nearly 200 feet further before the coal is reached; and by that time the workings of No. 4 Pit will not be far away from them.

"They have already extended their railway system to the pit, so after they get to the coal there will be no delay in waiting for the cars to take away the coal.

"As the coal is good in No 4, and in East Wellington Pit, it is almost sure to be good in No. 6 Pit.

"EAST WELLINGTON COLLIERY.

"This colliery is described in a previous report as the property of R. D. Chandler, Esq., of San Francisco, but it is now known as the mine of the East Wellington Coal Company. The mine has been worked steadily during the greater part of the year, although not taking out a very large quantity of coal.

"At the time of my last report the Company were sinking their second and what is called their No. 2 Shaft. The two shafts are fully half a mile apart in a direct course; the places are connected underground, and in the winding of the workings there are 1,400 yards of a level to connect.

"All the workings in this colliery are on what is known as the long wall system, which is very successfully carried out, both for safety and in the matter of leaving no coal behind to be lost.

"In the No. 1 Pit the level going east from the shaft was stopped on a fault, and it has been standing for a long time. About three months ago they resumed work here, and after drifting a few yards struck good coal, and they are now into it for quite a distance, keeping very good and thick, with a good roof.

"The coal in the west side continues to keep good and hard, although not so thick as the east side, but here the roof is very strong.

"In the No. 2 Pit of the East Wellington Colliery the coal is very good and hard. After the Company got their shaft down the appearance of the coal gave them great encouragement, so they spared no expense in fixing up appliances on top for economizing labour in the handling of the coal. There are two large shutes for ordinary use, besides large bunkers for storage of coal in case there should be no ships at their loading wharf ready to receive it, the bunkers being high enough above their railway to admit of the coal running into the cars without handling. The coal in this mine is very hard and of its usual good quality. The roof is, however, not as strong as in the No. 1 Pit.

"As I have mentioned, this mine is worked on the long wall system. After the shaft was got down and everything ready on the top, they then began to take out the coal, commencing at the shaft and taking all the coal out, putting wood cogs to support the roof; so that, with the exception of the roadways, it was well filled, and has not settled far. Now that they have got the coal worked out for a considerable distance all round, the further they get away, the greater will be the spread of the faces (or stalls), the shaft being the centre. Ventilation is good; motive power, a furnace at No. 1 Pit, one division of which is upcast for both places, the other division being the downcast for part of the workings of the No. 1 Pit. As you will have seen, the workings being long wall, the air comes in at one end of each division, sweeps along the face and out at the other end; and as the goaf behind is well filled, there is not

much chance for gas to collect. As, however, the workmen have to blast rock from the roof in the roadway to give them sufficient height, and in so doing sometimes tear up a few inches, leaving what is by miners called a 'pot-hole,' in which, as the roof settles, gas may be found, precaution is taken, and if, on searching for it, any gas is found, a curtain is put up directly, leaving a space on the top for air to go over, and by so doing the gas is carried away.

"These are now the only mines of any extent in which the workmen do not send deputations to examine the mines, under section 46, General Rule 31. The Manager (Mr. Chandler) has asked them on different occasions to examine his mines, and stated that he would supply them with anything they required for the purpose, and would also send a man along with them who was acquainted with the workings, so that no place would be missed. The response of the miners was that they were satisfied with the mines.

"While the East Wellington Company are adopting all necessary measures for the proper working of their mines and the safety of the workmen, as you will have noticed from my previous remarks, the Company are at the same time energetically proving their property, with excellent prospects for the present year (1889), both in the No. 1 and No. 2 Pits. The Company are generally admitted to be deserving of success, and it is hoped they are now about to realize the same, after having passed through so many difficulties as they have had to encounter since they began operations.

"UNION COLLIERY (COMOX).

"This is a new colliery in course of development, in the Comox District, by the Union Colliery Company.

"The District of Comox, for many years back, has been supposed to be rich in coal, but there was comparatively little done to prove it until the Union Colliery Company commenced operations last spring, and started to open out the coal measures there, with the view of establishing a successful colliery. They found the coal, and in the outcrop they started levels in two places, with airways going parallel to and only a few yards from them. Those levels were drifted in for about 500 feet, and for nearly all that distance the coal is good and very hard, and will average fully 3 feet in thickness, but at this point the levels were stopped until the railway could be completed. The mining operations were, however, by no means stopped, as attention was turned to another place about 800 yards from the above-mentioned levels, where they set about exploring for a lower seam of coal which was known to be below them, and this seam they succeeded in finding. In the first place they sank a shaft and ran a slope from the bottom of the shaft for a long distance to the dip, the coal improving as they went down. On seeing how the coal was, as to its quality, regularity, and pitch, they then started to run a slope in from the surface, and, after being much troubled with water and slum, they got to the coal. This slope is now a long distance down—a thousand feet—with good coal the most of the way. The coal is very hard, and of good quality, and will stand all necessary handling and shipping without much breakage or waste. As to quality and nature, this seems to be the same as Wellington coal, and now, from the successful result of the explorations, and the extensive character of the works in course of construction, it may be taken as a settled fact that there is going to be a large and very extensive colliery in this locality. During the work of prospecting for and finding the coal, those who were engaged in the department of the railway and other works required for the transport of the coal to the seaboard, and its shipment there, were not by any means idle. The engineers surveyed and located the line for a railway from the mines to a shipping terminus, and as soon as that was done hundreds of men were employed and the work was pushed on with all haste. There is one very large bridge with a Howe truss over the Trent River, on the line of the railway, which, from the shipping wharves to the mines, is eleven miles in length. The rails are laid to the standard gauge for the full distance. At the harbour, which bears the appropriate name of Union Bay, there are very commodious wharves. I think I will be quite safe in saying that they are the largest wharves in this Province. Four of the longest ships could lie at the principal shipping wharf, and all be loading coal at any stage of the tide. At the other large wharf freight can be discharged and loaded directly on the cars; at the same time coal may be loaded into vessels there if required.

"All the work of prospecting, railroad construction, and wharf-building has been done, since the commencement made in last spring, by the well-directed energy of a numerous body of workmen, involving the expenditure of a large amount of capital, which has greatly helped on the District of Comox, and has and will doubtless prove a benefit to the country in general.

"It is hoped that the enterprising proprietors will have good returns as the result of their gigantic enterprise. As yet, they have not shipped any coal, but I expect this colliery will have a large output by the end of the year.

"There is, in addition to the works mentioned, a steam saw-mill of considerable capacity erected near the mines, and situated conveniently to plenty of timber of all sizes.

"PROSPECTING.

"There has been a considerable amount of work of this nature done during the past year, not included in the works already mentioned. Amongst these by the Vancouver Coal Co. is a bore started and now at work in the bottom of No. 2 Esplanade Shaft. This bore-hole is now down 760 feet below the bottom of the shaft, or 1,370 feet from the surface. Measures are favourable for finding what is known as the Wellington seam.

"In the above-named Company's North Field, in Mountain District, three bores were put down to the Wellington Coal and several other trial shafts were put down to the rock, and now they are so far satisfied with the prospects that they have begun to put down a shaft with engine for hoisting, head gear and other appliances, and from what is known of the bore-holes the coal may be expected to be reached at 400 feet from the surface.

"The Vancouver Coal Company also commenced boring at about half a mile from Nanaimo River in their South Field.

"The same company has also done some prospecting, on their property called Harewood Estate, by sinking a shaft 70 feet to the coal. They drifted a little but the coal was not good as they appeared to have got down on a fault. It is their intention to continue the exploring here in the coming summer.

"The bore-hole mentioned in a previous report as being put down by the Vancouver Coal Company in Gabriola Island, and which was, at the time of my report, down 1,000 feet, has been continued during the most of the past year, and has now reached the depth of 1,970 feet, and has not yet reached the coal, but the core now got out shows that they are in the productive measures overlying the coal, and it is to be hoped that it will be struck soon.

"The above described exploring of the Vancouver Coal Company, and the prospecting that Messrs. Dunsmuir & Sons have been doing, may fairly be expected to yield handsome results, which will prove an encouragement to others to start.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES FOR THE YEAR ENDING 31ST DECEMBER, 1888.

"On the 24th January the following persons were injured and killed by an explosion in the No. 5 Pit, Wellington Colliery :—

"Injured, a Chinaman, Bong.

"*Killed.*

"R. Greenwell, John McNeill, D. McDonald, John Barki, John Stewart, William Wilks, John Belloni, Frank McCoy, Charles Tillar, David Gordon, John Marshall, Richard Vincent, Ezra Godfrey, Robt. Robinson, James Morrison, Flavier Regard, William Finch, Joseph Chenat, Lance Robson, James Jones, Jacob Klinn, Elisha Davis, Leopold Regard, John Williams, Valencia Valaria, Robert Williams, John Wienkottea, John Ness, Alex. Ross, William Dowler, William Horne;

"The results of these inspections, at some pits are posted up in some conspicuous place, where all can see them, as well as entered in a book kept for that purpose, so that such inspections are useful for both manager and workmen.

"I need hardly state, that I am always ready to attend to any matter that may be brought before my notice as Inspector, by any one who has a cause for complaint.

"I will now conclude my report with the hope that the year before us may be free from any serious accidents, and it may prove a prosperous year to the mining industry and the workmen in common.

"Appended hereto are the Annual Colliery Returns :—

"I have, &c.,
(Signed) "ARCHIBALD DICK,
"*Government Inspector of Mines.*

"*To the Hon. John Robson.*"

COLLIERY RETURNS.

NANAIMO COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.		No. of Tons sold for home consumption.		No. of Tons sold for exportation.		No. of tons on hand 1st January, 1888.		No. of Tons unsold, including coal in stock, Jan. 1st, 1889.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
258,817	8	39,731	11	215,252	12	1,288	9	5,121	14

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
30	819	80	16	$2.00 to $4.00	$1.00 @ $1.25	$2.00
Total hands employed 945				Miners' earnings, per day ..... $3 to $4		

Name of Seams or Pits—South Field No. 2, South Field No. 3, and No. 1 Shaft.

Value of plant—$350,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—South Field No. 2, worked by slope, seam 6 to 10 feet; South Field No. 3, worked by shaft, seam 5 to 10 feet; No. 1 Shaft, worked by shaft, seam 5 to 12 feet.

Description and length of tramway, plant, &c.—Railway to South Field, 5 miles with sidings; railway to No. 1 Shaft, 1 mile with sidings; rails are of steel, 56 lbs. per yard of standard gauge, viz.: 4 ft. 8½ in.; 8 hauling and pumping engines; 12 steam-pumps; 4 locomotives; 150 coal cars (6 tons), besides lumber and ballast cars; fitting shops for machinery repairs, with turning lathes, boring, drilling, planing, screw-cutting machines, hydraulic press, steam hammer, etc., etc.; diamond boring machinery for exploratory work (bores to 4,000 feet); wharves, 1,070 feet frontage, at which ships of the largest size can load at all stages of the tide.

SAMUEL M. ROBINS,
Superintendent, The Vancouver Coal Mining and Land Co., Limited.

WELLINGTON COLLIERIES.

Output of Coal for 12 months ending December 31st, 1888.		No. of Tons sold for home consumption.		No. of Tons sold for exportation.		No. of Tons on hand 1st January, 1888.		No. of Tons unsold including coal in stock, Jan. 1st, 1889.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
198,392	—	70,041	19	124,649	—	271	--	3,701	1

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
10	585	100	None.	$2.00 to $3.75	$1.00 to $1.75	——
Total hands employed 695				Miners' earnings, per day ..... $3.50 to $4.50		

Name of Seams or Pits—Wellington

Value of plant—$250,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—6 to 10 feet thick; 4 shafts; 3 air shafts.

Description and length of tramway, plant, &c.—Eleven miles of railway; 6 locomotives; 210 coal waggons; 11 stationery engines; 9 steam-pumps; 4 wharves for loading vessels, with bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.	No. of Tons sold for home consumption.	No. of Tons sold for exportation.	No. of tons on hand 1st January, 1888.	No. of Tons unsold including coal in stock, Jan. 1st, 1889.
30,092 tons.	6,179	25,818	2,000	100

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
2	120	10	None.	$2.50 to $5.00	$1.00 to $1.25	——
Total hands employed 132				Miners' earnings, per day ..... $3 to $5		

Name of Seams or Pits—East Wellington, Nos. 1 and 2 Shafts.

Value of plant—$140,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—One seam, 2½ feet to 6 feet in thickness; 5 levels; 2 shafts.

Description and length of tramway, plant, &c.—Railroad, 4½ miles, narrow gauge; 2 locomotives; 30 4½-ton cars; 2 pair hoisting engines; 1 large donkey engine; 1 steam pile driver; 1 steam saw-mill complete, capacity 12,000 feet per day.

EAST WELLINGTON COAL CO.

UNION COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.	No. of Tons sold for home consumption.	No. of Tons sold for exportation.	No. of Tons on hand 1st January, 1888.	No. of Tons unsold including coal in stock Jan. 1st, 1889.
2,000 tons.	None.	None.	None.	2,000 tons.

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
None.	90	150	None.	$2.50 to $4.00	$1.00 to $1.25	—
Total hands employed..... 240				Miners' earnings, per day .....$3.50 to $4.50		

Name of Seams or Pit—Union Colliery

Value of plant—$25,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—One shaft; 1 slope; 4 levels; 3 tunnels; 1 air shaft.

Description and length of tramway, plant, &c.—Eleven miles of railway; 1 locomotive; 3 engines; 2 steam pumps; 1 steam saw-mill; 2 wharves.

JAMES DUNSMUIR,
Managing Director.

VICTORIA: Printed by RICHARD WOLFENDEN, Government Printer, at the Government Printing Office, James' Bay.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1889,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, Printer to the Queen's Most Excellent Majesty.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1889,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia.

VICTORIA, B. C.:
rinted by RICHARD WOLFENDEN, Printer to the Queen's Most Excellent Majesty.

Value of Gold per ounce.	Estimated value of yield for the year.	Value of Silver per ounce.	Estimated value of yield for the year.	Total Divisions.		Total Districts.		Remarks.
				Gold.	Silver.	Gold.	Silver.	

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold and silver; the number of miners employed; and their average earnings per man, per year, from 1858 to 1889.

Year.	Amount of gold actually known to have been exported by Banks.	Add one-third more estimate of gold carried away in private hands.	Gold. Total.	Estimated yield Silver.	Gold and Silver. Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	$ 390,265	$ 130,088	$ 520,353	.....	$ 520,353	3,000	$ 173
1859	1,211,304	403,768	1,615,072	.....	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	.....	2,228,543	4,400	506
1861	1,999,589	666,529	2,666,118	.....	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	.....	4,246,266	4,100	517
1863						4,400	482
1864	2,801,888	933,962	3,735,850	.....	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	.....	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	.....	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	.....	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	.....	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	.....	1,774,978	2,369	749
1870	1,002,717	334,239	1,336,956	.....	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	.....	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	.....	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	.....	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	.....	1,844,618	2,868	643
1875	1,856,178	618,726	2,474,904	.....	2,474,904	2,024	1,222
1876	1,339,986	446,662	1,786,648	.....	1,786,648	2,282	783
1877	1,206,136	402,045	1,608,182	.....	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	.....	1,275,204	1,883	677
1879	1,075,049	,, 215,009	1,290,058	.....	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	.....	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	.....	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	.....	954,085	1,738	548
1883	661,877	,, 132,375	794,252	.....	794,252	1,965	404
1884	613,304	,, 122,861	736,165	.....	736,165	1,858	396
1885	594,782	,, 118,956	713,738	.....	713,738	2,902	246
1886	753,043	,, 150,608	903,651	.....	903,651	3,147	287
1887	578,924	,, 115,785	693,709	.....	693,709	2,342*	296
1888	513,943	,, 102,788	616,731	.....	616,731	2,007	307
1889	490,769	,, 98,154	588,923	$ 47,873	636,796	1,929	330
					$52,236,753		

* This is exclusive of over 650 white men who, during the season of 1887, were working on or prospecting for mineral claims.

REPORT

OF THE

MINISTER OF MINES,

1889.

To His Honour HUGH NELSON,

Lieutenant-Governor of the Province of British Columbia:

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1889, is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,

5th February, 1890.

REPORT.

GOLD.

The value of the Gold exported by the Banks at Victoria during the year 1889, is as follows:—

Bank of British Columbia	$254,816
Garesché, Green & Co.	188,580
Bank of British North America	47,373
	$490,769

CARIBOO.

MR. BOWRON'S REPORT.

"RICHFIELD, November 25th, 1889.

"SIR,—I have the honour to submit, for your information, my fifteenth annual report upon the mines and mining industry of the Cariboo District, accompanied by the customary statistics in tabular form, from which it will be seen that the gold yield of the district taken as a whole is a trifle under the output of last year; the number of white men engaged in mining being about the same, while it will be observed there is a decrease in the number of Chinese so employed.

"But little prospecting for new creeks at a distance has been done during the year. One party of four men started late last fall down Willow River with boats, and spent the greater part of the winter in prospecting the bars, benches, and in some instances the deep ground, on that river and its tributaries. They found gold in nearly every place tried, but not in sufficient quantities to pay at the present prices of supplies and consequent high cost of prospecting; but, with railway communication, a large extent of country was traversed that it is believed would prove remunerative.

"The Barkerville Polling Division still maintains its supremacy as the chief gold producer.

"Williams Creek, with tributaries, worked for nearly thirty years, still yields more gold than any other creek in the Province. The gold is now taken principally from the hills and sides of the creek by means of hydraulic pipes, as the creek channel has been pretty well worked out by drifting, although upper-streaks are frequently found to pay, and hence the lasting nature of the creek.

"Messrs. Taylor & Boyce, working about half-a-mile above Richfield, have been fortunate enough to come upon a portion of the old channel of Williams Creek hitherto unworked, and from the result of working a small piece of the ground this year have high expectations for next year's operations.

"The Forest Rose hydraulic claim has again yielded handsome returns, which it will undoubtedly do for many years to come. The deep ground below Cameronton, although known to be rich, still lies, as it has done for the last dozen years, unworked, presumably because it is beyond the ability of individual miners to operate successfully owing to lack of drainage. This ground offers an exceptional opportunity for the investment of capital, with a certainty of satisfactory returns if properly managed.

"On Conklin Gulch, the Gulch Hydraulic Company has made good progress with their 'cut' and laying down flume, and each season as it nears the bed-rock, the wash-up improves.

"On Stout's Gulch the Wintrip claim did fairly well, but the continual slides from the side-hills greatly retarded progress.

"The yield of gold from Grouse Creek has been better than for some years past, principally owing to a discovery made by Messrs. Jarvis, McAlinden and Company, which bids fair at the present writing to be of considerable importance, and will probably lead to the opening up of from half to three-fourths of a mile of a lead lost on this creek, as below the Heron Company, which paid so well in 1866–7, the lead could not be found. The discovery of Jarvis and Company is apparently a channel of about twenty feet wide (with well-defined rim-rock) running into the hill nearly opposite McAlinden's store, from which the company have already taken some four thousand dollars, and will continue the work during the winter.

"The Waverley Hydraulic Company have made satisfactory progress and will, it is thought, reach bed-rock with their 'cut' next season, after which, it is believed, the claim will be remunerative.

"Antler Creek has not met expectations this season.

"The Nason Company, driven out of their works last winter by an insufficiency of water to drive their machinery, owing to the frost, started again in July, and barely got the water out of their diggings when one of the gudgeons (a heavy casting) broke, which had to be replaced by a new one from the foundry at Victoria; the necessary repairs were made and the water is once more out of the diggings, and there is now a prospect of the value of the claim being proven.

"An attempt was made this fall by a company to reach bed-rock in the deep ground some ten miles below Grouse Creek, where the bottom has never been reached. Eight of our best miners endeavouring to get down without wheel and pumps, were driven out when down twenty-six feet. They speak of putting up machinery and making another attempt in the Spring.

"The claims on Mosquito Creek and gulches in that vicinity have done exceedingly well, considering that they are mostly hydraulic claims and that the water supply has been light.

"In the Lightning Creek Division the gold product upon the whole has been fair, considering that there are so few of what are thought to be really good claims.

"On Rushon Creek a company of white men have very good diggings; aside from which nearly the whole yield of this division is now produced by the Chinese.

"The Quesnellemouth Division does not make as good a showing as last year, although the number of men (Chinese) employed is about the same.

"On Hixon Creek, Senator Reid and Company have put on a force of men, and will carry on operations during the winter, running tunnels with the view of striking a back channel which it is supposed runs through the hill immediately below the Quesnelle Quartz Mining Company's mineral locations.

"I regret to say that no attempt has been made during the season to further prove the value of the discoveries made three years ago on Goat River and other tributaries of the Upper Fraser, which is somewhat surprising in view of the fact that it was reported, and generally believed, that there was plenty of ground that would pay four dollars a day to the hand in that neighbourhood. With better facilities for transport, this extensive field would support a large population.

"The accompanying statistics will, I believe, give a tolerably correct impression as to the works going on in the various sections of the district in alluvial mining; but to arrive at an estimate of the gold yield of the whole district for the twelve months of 1889, I beg to submit the following as closely approximate:—

Barkerville Division, 1st January to 15th November	$ 78,542
Lightning Creek " " " "	41,150
Quesnelle " " " "	37,000
Keithley and Harvey " " "	61,200
Desultory, of which no account is obtainable	7,000
Whole district, from 15th November to 31st December	10,000
Making a total for the year of	$234,892

"*Quartz.*

"Our Quartz interests, which must be regarded as the main source from which the future wealth of the district must flow, is a subject that should be dealt with by men experienced in the treatment of ores; and I may here volunteer the observation that if this view were more generally accepted, it would, I believe, be fruitful of good to the interests involved.

"Although this branch of our mining industry has not developed to the extent anticipated in my last annual report, I am not prepared to attach blame to any person therefor, but rather to my own inexperience in such matters and consequent lack of judgment in properly estimating the difficulties and drawbacks which I am now satisfied are inseparable from the establishment of pioneer reduction works here, as in any country so far removed from the source of supplies.

"Mr. Martin has given his best attention to the completion of the Government Test Works here, and although, so far, but one trial test has been made of ore, viz.: that from the Black-Jack mine, the result (although not satisfactory to Mr. Martin himself) was satisfactory to the company, as showing that their mine is valuable, and demonstrating the fact that we have valuable ore in the country.

"From one hundred tons of ore worked at the Black-Jack mill, $523.00 were obtained in free gold on the plates; and from twelve tons of the concentrates (of which there were thirty-six tons from the one hundred tons crushed) a return of twenty-four dollars ($24.00) to the ton of concentrates was obtained, but from the assays made of the concentrates by Mr. Martin he was not satisfied with the percentage saved, so would run no more through until certain appliances were added to the mill, which are now on the way from Ashcroft Station and which he expects to have in operation two weeks after their arrival. Several lots of ore are now at the works awaiting treatment.

"The district has been visited during the summer by Mr. Samuel Gifford, of London, representing English capitalists, who came here at the instance of C. D. Rand and Company, who have a number of quartz locations in the district. Mr. Gifford, being a man who has devoted his life to the development of quartz mines in various parts of the world, is thoroughly conversant with the treatment of ores by the most modern and improved methods, and although from the nature of his engagements was not at liberty to give his opinion respecting the value of our quartz mines, still, the interest he manifested in the mines, the Government Test Works, the mining laws of the Province, &c., &c., warrant the belief that his visit will be productive of great good to the district.

"The one great drawback to our advancement, with which Mr. Gifford seems to have been impressed, is the want of railway communication, and without which, development will necessarily be slow.

"This necessity is, however, so fully appreciated by the Government, who, having the best interests of the district in view, will not fail to forward in every possible way the consummation of so desirable an object.

"I have, &c.,
(Signed,) "JNO. BOWRON,
Gold Commissioner.

"*To the Hon. Jno. Robson,*
"*Minister of Mines.*"

MR. MARTIN'S REPORT.

"GOVERNMENT REDUCTION WORKS,
"BARKERVILLE, B. C., 28th December, 1889.

"SIR,—I have the honour to submit the following report of the work done at the above works.

"The works were completed about the latter part of January last, with the exception of a few things that could not possibly be done in midwinter. It was my intention to put in buddling troughs to concentrate the sulphurets from test lots of ore sent in for trial, but some of the members suggested that I should apply to the Honourable Provincial Secretary for an automatic concentrator, which they considered would give better satisfaction to depositors of small lots of ore, and to the community. The request was granted, and, after several delays, the concentrator arrived here on June 26th. We immediately set to work to erect it in place, and for five days, after completing the machine, we crushed several tons of waste quartz rock and passed it over the machine so as to thoroughly test it and instruct the men in charge how to operate it. Everything being satisfactory, on July 22nd we commenced crushing two lots of ore from the "Dufferin" mine—one lot of 2,600 lbs. and one of 2,300 lbs.—then followed on with 20,300 lbs. from the "Proserpine," 20,250 lbs. from the "Forest" mine, and 19,869 lbs.

from the "Lowhee" mine. The concentrating machine did very good work, saving over ninety per cent. of the value left in the ore, after it had passed over copper plates. The concentrates from the above lots will be chlorinated when the "Black Jack" concentrates are finished with, which will be some time next month.

"The roasting furnace was started on July 8th on 44,500 lbs. of concentrates from the "Black Jack" quartz mine. Some difficulty was experienced in instructing the men how to roast the ore successfully, but proceeding slowly and patiently for a time, we succeeded in getting them to do their work well. It was important that this part of the operation should be properly done, because upon it depended the success of the remaining part of the process.

"Twelve tons of the roasted concentrates were treated by amalgamation in 3,000 lb. lots, modifying the treatment a little in each case, but in no case could we extract more than sixty per cent of the value. The reason of this was that the mercury was broken up very fine, which then coated the magnetic oxide contained in the roasted concentrates, and we failed to settle and separate it from the tailings.

"It being impossible to estimate what the cost would be to experiment and find out the exact way of treating these concentrates by amalgamation, I applied to the Honourable Provincial Secretary for a small chlorinating plant, which, from tests made on a small scale, I was satisfied would work up to ninety per cent. This, with the necessary chemicals, took several months to get here and to erect in place, so that it was not until the 9th of December that we started the roaster on a second lot of concentrates from the "Black Jack Quartz Company," and the chlorinating plant on the first lot of Black Jack concentrates, which were put through at the rate of one ton per day. Up to date we have chlorinated about fifteen tons of concentrates, which show, from assays made of the tailings, that over ninety per cent. of the gold was extracted. We have two tons in the tub now chlorinating. Every part of the plant is working satisfactorily. The B. C. Mining Company's ore has been declared by competent assayers and metallurgists to be amalgamating ore. The Island Mountain Company's ore, from tests made in San Francisco, has also been declared a roasting and amalgamating ore. When these companies are ready to start working their mines these works will be able to test their ores satisfactorily by amalgamation or chlorination, and to find out the proper method before they commence erecting works for themselves, and they can have from these works well trained men to conduct the process for them without fear of failure.

"The "Black Jack Quartz Mining Company" commenced crushing ore on June 1st in their one-stamp Kendall Mill, and managed to put through 202 tons before the frost compelled them to close down The ore averaged 4.50 dollars in free gold and 13.00 dollars in sulphurets per ton of rock crushed. In blasting the rock in the shaft the sulphurets were shattered very fine, which then mixed with the waste rock, and it was found almost impossible to separate the ore from the waste, so that nearly all the rock taken out was sent to the mill, and accounts for the low grade of the ore. The endeavour in this case was to develop the mine, and to mill what ore was taken out to pay the running expenses. Sinking the shaft and milling the ore from it cost more than double what it will cost to mine and mill the ore when the mine is thoroughly opened. A shaft was sunk 42 feet deep and a drift of 22 feet run on the ledge, when it was found that the ledge changed its course, which made it necessary to stope up an incline shaft to the surface, from which the ledge can be worked to better advantage. The incline shaft had reached within 5 or 6 feet of the surface when the mine was closed down for the winter.

"This mine clearly shows what can be done in this district by energy aud perseverance.

"I have, etc.,
(Signed) "E. A. MARTIN.

"*To the Honourable John Robson,*
"*Minister of Mines, Victoria.*"

MR. STEPHENSON'S REPORT.

"FORKS QUESNELLE, B. C.,
"8th November, 1889.

"SIR,—I have the honour to forward herewith the estimated yield of gold for the Keithley, Alexandria and Williams Lake Divisions of Cariboo District.

"There was a very light snowfall in this section last winter; that, and a very dry season during the summer months, caused a limited supply of water for hydraulic mining, which in some instances was unfavourable, while on the other hand it enabled other places to be worked to better advantage.

"On Keithley Creek two Chinese companies are digging ditches and preparing for hydraulic work in the spring. As the bed of the creek is getting worked out they are turning their attention to the gravel deposits in the hill sides, and I think with fair prospects of success.

"On Snowshoe Creek, Messrs. Veith & Borland have just finished a ditch, and are now getting a set of iron hydraulic pipes on the ground for the working of the Hayward claim, which is supposed to be a continuation of the Live Yank lead, now so successfully worked by Messrs. Anderson and Smith.

"On Harvey Creek, the Jubilee Company have been working steadily all summer, sawing lumber, fluming the creek, building a wheel and putting down an incline. They will now soon commence washing, the winter being the most favorable time for their work underground drifting out the bed of the creek.

"On the North Fork of Quesnelle River, James Moore & Co. are running a tunnel at the mouth of Spanish Creek. It will take them all the winter and well on in the spring before they get in to where they expect to find pay. They are the only white men on the North Fork, all the rest of the mining going on at present being done by Chinese.

"On the South Fork of Quesnelle River, a company of white men have been prospecting during the summer, and have located some ground for hydraulic mining. The great trouble will be to get water on the ground. To accomplish this they will either have to drive a tunnel one mile long to bring the water from a lake, or will have to make a ditch about twelve miles long. Either job will take considerable time and money. The company now say they are going on with the work in the spring, just as soon as they can get accurate survey lines run and determine which way they will bring in the water. A good supply of water would open up several good hydraulic claims along the South Fork of Quesnelle River. At present there is only one such claim working, and owing to the scarcity of water they do not work more than three months in the year, while the mining season will admit of from seven to eight months work during the year.

"On the main Quesnelle, from the Forks down, there is yet some mining going on in a desultory manner by the Chinese. They keep moving along, working a while in one place then in another for forty miles from here down. They draw their supplies from here, as they can use boats on the river, which enables them to easily move from one place to another.

"From Horsefly there is nothing of moment to report. The Harper claim, so far, has not proved successful; and there is only one claim, the "McCallum," or Discovery Company, that is paying, none of the others having yet got into the channel.

"Along the Fraser River, in the Alexandria and Williams Lake Divisions, a distance of about seventy miles, there are six Chinese companies working. These companies have ditches and water rights and are permanently located, while there are also other Chinese working along the river rocking. They generally have boats or canoes; they carry their whole outfit along, and keep moving up and down the river just as they find a prospect.

"I have, etc.,
(Signed) W. STEPHENSON,
"*Government Agent.*"

"*The Honourable the Minister of Mines.*"

CASSIAR.

MR. CRIMP'S REPORT.

"TELEGRAPH CREEK, CASSIAR,
"19th October, 1889.

"SIR,—I have the honour herewith to enclose the mining statistics for the current year, and also a few remarks on the mining industry of this district.

"It will be seen by the returns that there has been a material increase in the yield of gold this year over last.

"The following statement is, I think, very near the actual amount taken out:—

Dease Creek	$11,200
Thibert "	10,800
McDames Creek	16,360
Quartz "	10,950
Snow "	600
Gold "	400
Poor Man's "	100
Stickeen River	1,000
Desultory	3,500
Total	$54,910

"The amount would have been very much larger if the season had been more favourable for mining, Since the middle of July there have been continuous heavy rains, which caused the different creeks to rise so high that all the wing-dams were swept away, and the consequence was very little gold was taken out from the beds of the creeks. The principal portion of the yield was from tunnels in the different hills.

"Very little prospecting has been done the past summer, and consequently I have no new discoveries to report.

"Mr. Robert Highland, of Telegraph Creek, and two others fitted out a boat and went down the Delaird River and prospected some of its tributaries. They went up the Highland River about 140 miles and prospected in different places, but without any result. They did not find anything that would justify their returning there again.

"The prospects for next year look as favourable, I think, as the past season has been; and I also think there will be about the same number of miners in the district.

"There are wintering on Dease Creek four whites and thirteen Chinese, on Thibert Creek eight whites and six Chinese, and on McDames Creek four whites and thirty-five Chinese. Quite a few miners will winter at Telegraph Creek and Glenora Landing, on the Stickeen. Provisions are plentiful, and at usual prices.

"I have, &c.,
(Signed) "J. L. CRIMP.

"*The Honourable John Robson,*
"*Minister of Mines, Victoria, B.C.*"

KOOTENAY.

Western Division.

MR. TUNSTALL'S REPORT.

"REVELSTOKE, December 1st, 1889.

"SIR,—I have the honour to forward the mining statistics for the District of West Kootenay, for the current year.

"*Big Bend Subdivision.*

"The Big Bend Placer Mines have attracted little attention during the past season, principally owing to the high cost of living. Ten cents per pound is asked for packing a distance of seventy miles; yet the small demand for freight and scarcity of feed for animals seem to render this charge necessary to properly remunerate the owner of the only pack train freighting from here to the Big Bend country.

"On McCulloch Creek, the Ophir Bedrock Flume Company has met with encouraging results, as it has run through the old ground which had been previously worked and from which little gold could be expected. The bank of gravel has also decreased in height, and the boulders encountered are not so numerous. The Last Chance Company took up last summer the ground formerly leased by the Baldhead Company, which was abandoned after running a tunnel 1100 feet long without reaching bedrock, caused by a mistake in the survey. The present company expects to reach the bottom of the channel about the early part of spring. Should its exertions meet with success the remainder of the vacant ground will be recorded and worked to advantage by small companies.

"On French Creek, Messrs. Goodwin, Hunter and others, known as the Consolation Company, obtained for a term of five years the ground formerly leased by the French Creek Tunnel Company. Shortly after beginning work they struck gravel which returns six ounces to the set, with every appearance of the pay being permanent.

"Near the mouth of Smith Creek, Lund & Company are hydraulicing a bench with very good results. Frost set in before their ground sluice was cleaned up, and further work had to be suspended for the season. About twenty-five Chinamen have been rocking on the bars of the Columbia River during the low stage of water, and sluicing on the benches when the water is high, but with what success could not be ascertained.

"The trail between here and McCulloch Creek will require considerable repairs next year to render it passable. The culverts and small bridges are in a decayed and dangerous condition, and will have to be renewed; also localities of a marshy nature corduroyed.

"*Illecillewaet Subdivision.*

"Mining operations in this portion of the district have not been of an active character, most of the miners having done merely sufficient work to hold their claims, although the principal locations compare favourably with any others in the Province. The galena ores average from twenty to eighty ounces of silver per ton, and from fifty to seventy per cent. lead.

"The Illecillewaet Mining Company owns three locations which are considered valuable, and a tunnel has been run two hundred feet to strike the vein. The Corbin and Kennedy mines consist of the Happy Find, Crystal, and Corbin & Kennedy, No. 2, from which rich assays have been obtained. The Selkirk Mining and Smelting Company also possesses three good locations; the principal one, the Lanark, has a shaft sunk to a depth of 120 feet, and a tunnel run in over 100 feet. Considerable shipments of ore were made from this mine a couple of years ago, with a stated profit of $65.00 to the ton. The Maple Leaf, owned by A. F. McKinnon, is held at $80,000. A tunnel in this claim exposes a vein of galena and carbonates of a high grade character, twenty-nine feet wide.

"The Cariboo Creek Mining Company, under the superintendence of D. Woolsey, is running a tunnel to tap the vein running through the Maple, Quebec, and Corona, about 400 feet from the surface. The adjoining mine to the above is the Round Hill, owned by Captain McCallum. There are several other groups of mineral claims in this subdivision which will come to the front as work progresses on them, among which the Gold Hill locations, and others, situated within a radius of a few miles, will prove of value with development. With this extensive mineral wealth in its vicinity, and smelting facilities within a comparatively short distance, the town of Illecillewaet is destined to become an important mining centre.

"*Fish Creek Mines.*

"The Fish Creek Mines are situated at a point about eleven miles south of the line of railway, and are known as the Dunvegan, Alma, Mogul and Edinboro. They are owned principally by Messrs. Boyd, Bain, Scott, and Kirkwood. The first mentioned claim is considered, by persons competent to judge, the equal in point of value of any mine in the West Kootenay district. A tunnel has been run a distance of over 70 feet to intersect the vein which is from 8 to 10 feet wide and contains a solid body of galena 4 feet wide, with an assay value of 80 to 150 ounces of silver to the ton. This property was bonded last October to Mr. J. Wilson, with a three months' option, for the sum of $75,000, with the privilege of extracting 150 tons of ore, which will be forwarded to the sampling works at Revelstoke. A good trail has been constructed from five miles above Illecillewaet to the mine, and a pack train is engaged transporting ore to the railway. The facility with which ore is extracted can be ascertained from the fact that the labour of two men in ten hours produced eleven tons. The first carload of average ore has been sampled, with an assay return of 90 ounces of silver to the ton, and 69 per cent. lead. This is a result which augurs well for this rich and promising section of the district, and adds to the number of first-class mines known to exist.

"*North Arm of Upper Arrow Lake.*

"On the north arm of Upper Arrow Lake there are ten locations, the principal ones being the Monarch, Silver King, Gloucester, Gipsy, Belfast, Argyle, North Star, and Yellow Jacket. Good ore has been found in some of the claims, but the mineral veins exposed will require more work to determine their value.

"*Toad Mountain Subdivision.*

"In the Toad Mountain mines the Hall locations occupy a prominent position in point of value and the amount of work done on them. The principal operations have been confined to the Silver King, from which 40 tons of ore yielded 11,960 ounces of silver, or an average of 299 ounces to the ton. Another shipment had been packed to Nelson and was awaiting transportation when I was there, the returns from which, I have since been informed, amounted to 230 ounces to the ton. A tunnel 60 feet long has been run on the vein, and a winze sunk at its extremity 50 feet, exhibiting at this depth a mass of high grade peacock ore, of unknown width, as the opposite walls had not yet been reached. The work done on the Kootenai, Bonanza, and American Flag, exhibit a similar richness to the Silver King on the surface, and, so far as ascertained, are equally as rich. The lode running through these claims is from 12 to 16 feet wide, six feet of which is of solid ore. The foot and hanging walls are composed of dolomite of lime, the country rock being granite. The course of the ledge is east and west, and has been traced for a distance of four miles over mountains and through intervening depressions. The following are the names of the additional locations: Victoria, Forest, Newmarket, Dandy, Iroquois, Grizzly Bear, Jim Crow, Snow Flake, Morning, Evening, and Tough Nut. Most of these contain ore of a more or less rich character. The body of ore in the Dandy is three feet wide and will yield over 60 ounces to the ton, and the Iroquois, Grizzly Bear, Evening, and Tough Nut, can ship ore of the same value. The latter was bonded by Mr. G. B. Wright for the sum of $60,000, but owing to some misunderstanding with the company he represented, the bond was cancelled. A shaft has been sunk to a depth of 25 feet and a tunnel run a length of 75 feet. The width of ledge is from four to eight feet, returning high assays. When proper facilities for transportation are supplied, work will be actively prosecuted in these mines for the purpose of shipping ores to the smelter.

"On the right bank of Cottonwood Smith Creek, which empties into the west arm of Kootenay Lake, a short distance below Nelson, is a group of claims owned by Dr. Labeau; they are the Apex, Fairview, Uncle Sam, and Umatilla. The vein is composed of argentiferous galena, varying from four to five feet wide, assaying as high as 80 ounces to the ton. The development of these locations will materially increase the prosperity of the Kootenay Lake country. On the summit of the mountain, at the head of the stream mentioned, on the left hand side, are the mines owned by the Cottonwood Gold Mining Company, composed principally of English shareholders. They are the Ella, Golden King, and Golden Wreath. These claims contain an immense deposit of schistose slate, over three hundred feet wide, which

assays $6.70 in gold to the ton. The surface is oxidized to a depth of several feet and is free milling in character. The principal amount of gold in the rock is associated with sulphurets, which will require concentrating to a value of $30.00 per ton to render profitable. The machinery erected on the ground consists of two Huntingdon mills, with a capacity of 12½ tons, operated by an engine of 20-horse power. This plant has not been found adapted to work ore of the character obtained; and I was told Mr. Stanley, the superintendent, had proceeded to England with the object of urging the erection of a 100-stamp battery, with necessary concentrators, next season.

"*Eagle Creek Subdivision.*

"The Eagle Creek mines are situated about six miles west of Nelson, on or in the vicinity of the creek of that name, and are reached by the trail in use between Nelson and the Columbia. The Eagle Creek Gold Mining Company's property consists of five locations on the right bank, extending up stream, and are known as the Poorman, Hardscrabble, Eagle, Hard-up, and Kootenay. This company has exhibited a great deal of energy in prosecuting its operations, which have been carried on under the able management of Mr. Nails. The ledge is gold-bearing and is well defined, lying between walls of hornblende granite, with a dip of about 45 degrees to the west. The breadth of the vein is from 20 to 24 inches, and possesses an assay value of $50.00 to the ton. In addition to other work performed, a tunnel has been run a length of 130 feet, intersecting the lode at a depth of 85 feet from the surface. The machinery, comprising a 10-stamp mill and four free concentrators of five tons capacity each, was floated down the Kootenay River on rafts as far as the natural obstructions of the river would permit, to a suitable place for its landing, whence a waggon road, 2½ miles long, was constructed to a site prepared for its erection. The building is being put up and the machinery, which will be worked by water power, will be in position to commence work in the spring. Messrs. White & Buchanan are the proprietors of two valuable extensions on this lode, which are considered equally as rich as the locations referred to.

"About half mile west of Eagle Creek, John Miles owns three locations, two of which, considering the small amount of work done, look exceedingly well. One of the claims, situated near the summit of the mountain, has a vein about 10 feet wide lying between well defined walls, containing galena ore which returns excellent assays in gold and silver. The other contains gold only, to what extent could not be learned, as the proprietor was absent when I called. More work will be required to establish its permanence, as the formation is irregular and broken up. About fifteen tons of good rock have been extracted and will be submitted to a test in the Eagle Company's mill.

"The Copper Queen is owned by Messrs. Barr, Baker and Brown. It is situated on the right bank of the Kootenay, some distance back of the river, probably a mile, and a little over that distance above Forty-nine Creek. It is a wonderful deposit of argentiferous copper ore from 50 to 60 feet wide, rising to a height of 30 feet above the surface for a length of between 500 and 600 feet. The ore contains silver to the extent of $26.00 per ton; the percentage of copper runs high. The formation is similar to the famed Anaconda mine in Montana, which has returned large dividends to its shareholders, the foot wall being of quartzite and the hanging wall of granite. The work done consists of open cuts run on the vein an aggregate distance of sixty-one feet, and a cross cut forty-five feet.

"Some eight or nine men were engaged the past summer mining for gold on Forty-nine Creek, with a return of from $1.50 to $2.00 per day, as far as can be known.

"*Hot Springs Subdivision.*

"The Hot Springs camp is situated on the north shore of Kootenay Lake, about 30 miles from Nelson in a north-easterly direction The mines seem to exist in successive tiers from near the foot of the mountain to the summit, increasing in richness with the elevation attained. The principal locations are noted for the extent and value of the mineral wealth they possess. About the latter end of September I called at the Hot Springs and was surprised to find the great improvement visible in some of the claims within a couple of months from the date of a previous visit. The surface in places has been subjected to upheavals and slides, which broke up and distributed the mineral lodes, rendering some of them difficult to trace, and causing the bodies of ore sometimes to perish out without any apparent cause. But as sinking progressed below the point of disturbance this irregularity ceased, and the veins which exhibited a tendency to disappear have widened and become so much better defined that no doubts are entertained

in regard to their permanence. The mining prospects of the camp never looked so promising as they do now. The lodes pursue a northerly and southerly course, and dip to the west. The claims first encountered on the mountain side contain a low grade galena lying in a schist formation, with veins of an average width of eight feet, assaying about 20 ounces in silver to the ton. Higher up a coarse cube galena exists under the same conditions as the preceding, with a return of from forty to fifty ounces to the ton. At a still greater elevation the mineral deposits lie in schist and lime, and contain ores of a high grade, ranging from twenty up to thousands of ounces to the ton. Wire silver is first found at this height, and the ore bodies exhibit the peculiarity of contracting to a few feet and widening to a breadth of thirty feet or more. At or near the summit carbonates of a very rich character are found in a lime formation in the vicinity of the granite belt. The mineral here is is free milling, and can be treated by the ordinary amalgamation process. The Skyline is the most valuable location found at this altitude. It is principally owned by Mr. A. D. Wheeler, who is also the proprietor of several other valuable claims. A shaft sunk to the depth of fifty-five feet exposes a vein eight feet wide, composed of almost entirely high grade ore, containing native silver and black sulphides, the latter running up to as high as $16,000 per ton. This, of course, is a choice assay. The Union is another location with an 8-foot ledge, carrying galena and carbonates, which looks very promising.

"The Neoshu is a recent discovery possessing very rich ore, containing native and ruby silver, but the amount of work accomplished so far has not been sufficient to prove its permanence. Among the valuable locations which exists may be mentioned the Krao, with a shaft 75 feet deep exhibiting a ledge 12 feet wide, yielding assays of from 40 to 60 ounces in silver. The United has an immense vein which will return from 25 to 40 ounces. The Little Donald, owned by Messrs. Davenport and Stevens, at a depth of 75 feet, shows, I am told, 4½ feet of solid ore of a valuable character. The Gallagher also gives good returns, one lot of ore containing thirteen tons smelted at Butte, Montana, yielding an average of 126 ounces of silver to the ton. The Number One exhibits a strong vein four feet wide, which it still retains at a depth of 48 feet. The ore returns large assays. This mine was bonded last fall by J. McKay, the great California capitalist, for the comparatively small sum of $16,000 for a term of six months. The Spokane, owned by the Pacific Bullion Co., of Spokane Falls, Wash., is a valuable mine upon which operations will be actively prosecuted. Extending in a southerly direction the Crow, Fledgeling, Now Then, Crescent, and Eden promise to become valuable mining properties.

"*Hendryx Mines.*

"The Hendryx mines are situated on the opposite side of the lake from the Hot Springs, a distance of about two and a half or three miles. They consist of two locations, for which Crown grants have been issued. The principal mine is known as the Blue Bell, after the small flower of that name which covers the ground in profusion at a certain season of the year. At the time of my visit a tunnel had been run a distance of 305 feet to intersect the vein at a height of 128 feet from the surface, and work was being vigorously prosecuted by means of an Ingersoll drill and air compressor, worked by a 25-horse power engine. The great advantage derived from using improved machinery of this kind is apparent when it is stated that the progress made in a single shift amounted to four feet in the hardest rock, whilst by manual labour, in the same time, but four inches would be accomplished. The lode is a mass of solid galena 86 feet wide, which gives an average assay of 20 ozs. of silver to the ton and 23 per cent. lead. Two adits cut the lode at higher levels, which everywhere shows ore of the same extent and quality. Another large vein, about seven feet wide, runs parallel to the main body. The quantity of mineral in sight seems almost inexhaustible, and though of a low grade, these mines are considered of great value, owing to the quantity and facility with which the ore can be extracted, reducing its cost to a minimum. The large amount disbursed in development has been expended by Dr. Hendryx and his brother in a judicious manner, and to-day it may be said the shareholders own one of the most desirable mining properties in the country. To properly utilize this wealth the erection of a smelter in the vicinity is considered necessary, and it is probable steps will be taken to construct one next summer.

"The number of records effected at the Revelstoke office since last report is 161; at Nelson 367; at the Hot Springs, for the three months ending October, 150. The following comprises the exports of ore from the mines mentioned, and the returns per ton, so far as ascertained:—Number One, 146 tons, 87 ozs. silver; Little Donald, 85 tons, 90 ozs. silver,

35 per cent. lead; Silver King—first shipment, 40 tons, 299 ozs. silver, 20 per cent. copper; second shipment—30 tons, 230 ozs. silver, 20 per cent. copper; Spokane, 65 tons, 40 ozs. silver 70 per cent. lead; Della, 20 tons, 120 ozs. silver; Skyline, 15 tons, 225 ozs. silver; Gallagher, 14 tons, 119 ozs. silver, $14 gold; Krao, 12 tons, 95 ozs. silver, 50 per cent. lead.

"The above shipments were made, in some instances, to pay current expenses, and in others for milling tests. The aggregate return for the 427 tons was 50,393 ozs. of silver. The rich mineral resources of the Kootenay Lake are undoubted. No further proof is required of its wealth than the developments exhibited in some of the mines, and the milling results obtained from the ores shipped. The business men of the State of Washington have not been slow in detecting the advantages offered, and every means will be taken to retain, at least, a large proportion of the trade that will necessarily ensue.

"Nearly all the supplies needed have been hitherto procured from Spokane Falls, notwithstanding the duties imposed, as being the most accessible point for the purpose.

"In addition to a contemplated branch line from Kootenai Station, on the Northern Pacific, to Bonner's Ferry, on the Kootenay River, a distance of about 30 miles, the Manitoba Railway intends to connect somewhere in the same direction. The Spokane & Northern has also given notice of application for a charter to operate a line starting from near the mouth of the Pen d'Oreille River, up the Salmon River Valley to Nelson.

"It is evident from the foregoing that exertions should be made to divert and retain this tide of prosperity for the benefit of the Province at large. This can be effected by providing railway communication between Revelstoke and Nelson. Two routes have been suggested as being available for the purpose. That from Revelstoke, down the Columbia and up the North Arm of Upper Arrow Lake, thence *via* Trout Lake and the valley of the Lardeau River, has hitherto been considered the most favourable; but Mr. Stewart, the engineer who explored that portion of the country, states that a considerable elevation within the comparatively short distance of four miles interposes too great an obstacle to be overcome. The other route, starting from the same point and following the river and Arrow Lakes to Sproat's Landing, to connect with the short line proposed to be built next spring, is deemed perfectly feasible.

"To accommodate the traffic during the summer months, in the absence of a railway between the Columbia and Kootenay Lake, a waggon road, enabling freight to be carried at an estimated cost of $10, between these two points would be considered indispensable; but this mode of conveyance, at the best, is a poor substitute for a railway, which can expeditiously perform the same service for about $4. The miner is thus benefited by the quicker and more convenient means of communication to the extent of $6 per ton. The charge for freight by steamer to Revelstoke will be $5 per ton, and the cost of smelting, Dr. Campbell states, will be the same as demanded by the Selby Smelting Works of San Francisco, from $13 to $15 per ton, according to the character of the ore supplied.

"The expenditure incurred by the owners of the 'Silver King,' Toad Mountain, from the mine to Nelson, by pack train, a distance of seven miles, was $10 per ton, and from thence to Butte, Montana, a distance of about 700 miles, including the cost of smelting, was in the vicinity of $47 more. The cost of transportation from the Hot Springs to the same destination, exclusive of carriage by pack train from the mines to the water's edge, which varied with the distance travelled, was $27.50 per ton, and the charge for smelting ores from that locality ranged from $8 to $18 per ton, according to their nature.

"The survey party at present operating between the Columbia and Nelson seems to give truth to the assurance that these two places will be connected by rail next summer; if so, with a large and swift steamer plying on the Columbia, which is at present under construction, and others to be placed on the route when necessary, the business will be easily controlled so long as the Columbia remains open; but the interests at stake are too important to be interrupted during the period the river is closed to navigation, and rail communication with the main line of the Canadian Pacific at Revelstoke will have to be effected to afford an outlet to this rich portion of the district.

"The remission of the duties on mining machinery cannot be too strongly urged on the attention of the Dominion Government. It is not manufactured in Canada, and being of an expensive nature, in addition to heavy charges for freight, an *ad valorem* duty of 33⅓ per cent. imposes a heavy burden which few companies are able to bear.

"When Mr. Mara, the member of Parliament for the district, was at Kootenay Lake, the subject was fully discussed with some of the principal mine owners, and he promised to use his influence for the removal of this drawback to an important industry, which, he stated, should

be encouraged to the fullest extent. The warm interest he takes in the matter will, it is hoped, be productive of good results. Increased prosperity means a large consumption of dutiable goods, the revenue from which would make up in a short time for the removal of this impost from the tariff.

"The completion of the works belonging to the Kootenay Smelting and Trading Company inaugurates a new era of prosperity in the history of the interior of this Province. They are situated a short distance below the town of Revelstoke, convenient to the river for the unloading of freight from steamers, and have a sampling and smelting capacity of 100 and 60 tons, respectively. Without going into details, I may state that they are supplied with the latest improvements, and contain all the necessary appliances for the efficient prosecution of the work for which they are intended, with the utmost economy of labour. The best of workmanship has been expended on the buildings, which are of a substantial character, under the supervision of Mr. R. Litster. The officers are Dr. Campbell, manager, and Mr. F. Roeser, assayer, two gentlemen of long experience in the departments over which they preside, to whom mine owners can entrust their business with the assurance of being honourably dealt with.

"The company is prepared to smelt ores at a stipulated price per ton; or will defray all charges on consignments, and after deducting therefor pay their cash value, based on the assays obtained. By the latter means the poor man can reap the benefit of his own labour without any unnecessary delay, and provide himself with means to develop his property for the purpose of making larger shipments.

"The public works requirements of the district are as follows:—A waggon road from Nelson to the summit of the Toad Mountain to enable the transportation of ore from the principal locations, is indispensable. The estimated distance is about seven miles, and a suitable grade can be obtained for the purpose. The construction of a wharf at Nelson is also a great necessity. At a low stage of water the steamers have to lie at a considerable distance from the shore, and the inconvenience and delay of landing freight on rafts have to be experienced. The distance from the bank to a depth of 4½ feet is 325 feet. Mr. Giffin, the Mining Recorder at Nelson, has submitted a plan for its construction, which will be forwarded to the Lands and Works Department.

"At the Hot Springs a road about five miles long is required to facilitate operations. To obtain this great convenience the miners are willing to give pecuniary assistance to the extent of $5,000. Trails suffice so long as prospecting is being carried on; but in the shipping of ores economy must prevail, and the least expensive mode of carriage has to be adopted to increase the profit on the high and medium grades of mineral, and secure satisfactory returns from those of a less valuable character.

"I have, etc.,
(Signed) "G. C. TUNSTALL,
"*Gold Commissioner.*

"*To the Honourable Jno. Robson,*
"*Minister of Mines.*"

Eastern Division.

MR. REDGRAVE'S REPORT.

"DONALD, B. C., December 16th, 1889.

"SIR,—I have the honour to submit to you my report upon the mining industry of East Kootenay District, and also statistics in reference to placer mines and mining, etc.

"*Porcupine Creek.*

"From this creek good prospects were found last year, and it was anticipated that quite a large amount of gold would be taken therefrom this season. To assist the miners, and to facilitate their getting supplies in cheaply, a good pack trail was made by the Government to that creek, but little gold was found, and that very much scattered amongst a mass of large boulders, which made it expensive to work. After working about three months, the miners virtually abandoned the creek; the pay to the hand not realizing more than $2.50 to $3.00 per day. The creek will be worked by a number of Chinese next season.

"*Quartz Creek.*

"On this creek large benches of good pay dirt have been found, and it is the intention of a number of miners to apply themselves in working the same by hydraulics in the spring.

"*Wild Horse Creek.*

"Owing to the low stage of water in this and other creeks, the falling off of the output of gold for the season's work is quite apparent, as nothing like full working time was accomplished. Six companies were hydraulicing; the interests held being thirteen in number, consisting of hill and bench claims; four white men and forty-five Chinese being engaged; at wages of $3.00 and $2.50 per day.

"*Perry Creek.*

"Placer mining is here prosecuted by the Perry Creek Gold Mining Company, Limited Liability, incorporated in 1887. Their tunnel, driven at a depth of several hundred feet under Mount Cenis, and following the ancient bed of the stream, is now about 900 feet in. Most of the ground encountered presents the features of a cañon, with the bed-rock, owing to the great rush of the waters, smooth and polished. Large boulders impeded the work, but wherever gravel and clay had lodged the ground was paying well. The company run cars on iron tracks in the tunnel, and they have machinery for driving pure air to the workings. The number of miners employed is from ten to fifteen, under a superintendent. The output for the year 1889 was valued at $6,500, the gold assaying in San Francisco as high as $18.50 per ounce. Five miles higher up on the same creek the said company have this year resumed work on their shaft, constructed in 1887. This shaft is sunk in the centre of the creek, 55 feet deep, and protected by a treble cofferdam. Having brought by pack animals, and partly on the backs of Indians, a powerful Cornish lift pump, of a total weight of 9,000 lbs., over a most inaccessible part of the country, it was placed in the shaft, which, by blasting through the solid bed-rock, had been deepened to 65 feet. Water was brought by a ditch and flume, and a large wheel in the latter, connected with the pump, kept the work clear. This consisted of drifts lengthwise and across the channel. Though the ground traversed in all directions by these drifts seemed most favourable for the lodgment of gold, only small quantities were found. The company sent orders in the month of October to temporarily cease working this portion of their ground. Of individual miners working on Perry Creek there are only two or three Chinese who are supposed to take out moderate wages.

"*Palmer's Bar.*

"Only one company of four Chinese were working on this bar—sluicing.

"*Moyea River.*

"A company of three Chinamen working, both with sluice and hydraulic, on this river.

"*Bull River.*

"Two white men working with sluices upon this river.

"*Findlay Creek.*

"Nothing has been done upon this creek during the past season. The property of the Findlay Creek Gold Mining Company is still considered valuable, and work will be commenced at their hydraulic mine at an early date next spring.

"The following is the approximate amount of gold taken out of the creeks, benches, and bars, as mentioned, viz.:—

"Porcupine Creek	$ 2,000
"Wild Horse Creek	20,000
"Palmer's Bar	1,000
"Moyea River	1,000
"Weaver Creek	2,000
"Bull River	800
"Desultory mining by whites and Chinese throughout the East Kootenay District	3,000
"Perry Creek Mining Company	6,500
"Total	$36,300

"The prospects for the miners are so alluring, and to those who have, especially the past season, turned their attention to the prospecting for minerals, that very little attention is now given to placer mining, and as the country is further explored, and minerals found, the little placer mining which will be carried on will be relegated to Chinese and those who have little ambition or are easily satisfied.

"MINERAL CLAIMS.

"One hundred and fifty new mineral locations have been recorded in this district during the past season, or from January to the present time, and forty re-records of those previously taken up. Representation work has been performed upon fifty locations, and forty-two bills of sale, and transfers of forty-seven claims have been made and bonded to different companies from Victoria, Vancouver, Toronto, and London, England, which are estimated of great value, and for which a considerable amount of cash was paid, the balance to be paid at the expiration of bonding.

"*Otter Tail.*

"Very little has been done in the development of the Otter Tail District, although it is known that fine deposits of galena ore exist in large quantities, and only await capital to prove that locality one soon to become prominent in the annals of quartz mining.

"*Windermere.*

"In the vicinity of Windermere two new locations were made, which are rich in copper, assaying $25 to $45 per ton with silver combined.

"*Findlay Creek.*

"From a claim on this creek, the 'Thunderer,' $45 to $80 in silver, with traces of gold, have been obtained from different assays.

"*Bull River.*

"A new mineral locality has been found in this part of the district by Mr. Cowan, of Fort Steele. Three locations have been recorded, and, from samples of ore assayed in Vancouver and other places, $9 in gold, $12 in silver, and 35 % in copper have been obtained.

"*Toby Creek.*

"This locality was fully reported upon last year. From discoveries made, locations recorded, and assessment work performed upon them, it was anticipated that good results would follow. Those expectations have been realized, and there is not a shadow of a doubt but that it will become one of the first centres in rich mineral ores in the East Kootenay District.

"A great quantity of work has been done; large ledges of silver and copper ores have been exposed; thirteen new locations have been recorded. The claims taken up last year have been worked and bonded for a considerable amount of money, and work is progressing upon them through the winter.

"The claims located are at a point about eighteen miles from the mouth of the creek. This creek empties into the Columbia River, where steamboats continually run in the summer months, enabling the miners to get in their supplies and forward the ore to Golden at a cheap rate, and where a smelter is about to be erected.

"*Spillemcheen.*

"On Spillemcheen Mountain a number of locations were made five years ago, and a vast amount of work has been done on the different claims located, but at the present time this locality is overlooked on account of richer mineral being found close by. Upon this vast lead—or mountain—of low grade ore is located the 'Rothchild' claim, and the 'Homestake,' 'Spillemcheen,' and 'Jumbo' claims, adjoining the 'Rothchild,' are continually being worked and developed. As soon as smelting works are within easy distance, the whole mountain will be again taken up and worked, on account of its inexhaustible mineral supply and easy access,

its location being about four miles from the Columbia River, and forty miles from the railway at Golden, and the great and never-failing water supply, will be utilized and governed for milling and mining purposes.

"*Jubilee Mountain.*

"This locality, or mountain, is situated about 2 miles from the Spillemcheen Mountain, and within a distance of 3 miles from the Columbia River. The locators, 6 in number, first recorded their claims two years ago, and from assays then made, of the ore then found, Jubilee Mountain came in to prominence, the assays going so high in silver that the finders consider it the "Eureka" and "Empyrean" of Eastern Kootenay.

"Vast ledges of silver and copper ores, 18 to 20 feet in width, have been developed and worked, and are now in an advanced stage; the assays obtained ranging from $50 to $400 per ton in silver, and very high in copper. From statements of experts from England, who represent great capitalists, the leads and deposits in this locality are pronounced as something wonderful, and vast in extent and richness that astounds them, and they prophesy the time is not distant when all the capital required for working these mines will be supplied in abundance, in fact is now waiting in England for just such undertakings.

"One company of English capitalists have secured six mineral claims out of the eleven new locations made this year, and from six which have been re-recorded.

"Development work has been performed on ten claims, and for the 'Constance' and 'Atlanta' Crown grants have been applied for.

"The 'Lancaster' claim is one of great prominence, shewing hundreds of tons of silver ore in sight. An offer of $50 per ton has been made to the party owning the mine for all ore supplied and for any amount of tons to be placed on the banks of the Columbia River. It must be very rich ore, as it would again have to be handled three different times before getting to the present smelter, the nearest one at the present time being Revelstoke, a distance of 120 miles from Jubilee by water and railway.

"The facilities are excellent for working claims on Jubilee Mountain, the cost of conveying the ore to the steamboat is trifling as compared with other localities, the distance being within two and three miles from steamboat communication.

"*McMurdo District.*

"Although but a small portion of this district and of its vast mineral wealth is known, sufficient reports have been made by men well versed in mineralogy to stamp it as one of the greatest silver bearing regions on the continent.

"A new route and building of a new trail by the Government has shortened the distance to a little over forty miles from Golden, a station on the C. P. R. admirably situated as a smelting point.

"The McMurdo discovery claims are located near the Glacier, which caps the head of the cañon threaded by the middle fork of the Spillemcheen River. The vein is a giant in the size of its outcrop and very rich in sulphide ores, some samples of tetrahedrite, or gray copper, running as high as $60 in gold and from $100 to $150 in silver.

"All the locations surrounding the discovery shew from 18 inches to 3 feet of mineralized quartz.

"The developments, which have only amounted to the annual assessments for the past two years, prove that in depth the minerals in the vein-stone are greatly augmented both in quantity and richness; the vein is in talcose state.

"Five miles in a south-easterly direction is a small basin-shaped depression christened 'Cariboo Basin.' About ten claims are located within its boundaries, but work has only been performed on two; these proved to be veins of copper sulphide ores associated with ribbon stringers of argentiferous galena.

"Across to the south-west of the cañon is another depression which is evidently the remains of a large tract of primitive table land. The melting during the glacial period has cut the surface down by hydraulicing a passage for its pent up waters into the cañon of the middle fork, which is called 'Carbonate Creek Mountain and Basin.'

"This mountain heads about N. W. by S. E. Its southern face and side is more or less gored for a distance of a mile by the outcrop of an immense lode on which a considerable amount of money for development during the past season has been expended.

"Last year a tunnel was made for a distance of 85 feet under one of the croppings upon the 'Monitor' claim. The vein was very much broken and out of place; the work shewed, however, that the mountain held greater inducements for the miner than at the surface. This lode and its mineral, which is a sulphide containing antimony, has been traced over two miles and across the cañon. It is in micaceous slates, having a dyke of granite gneiss as its hanging wall. Running parallel to the above is another lode—the two being separated only by about 500 feet of country rock. It is highly argentiferous galena impregnated with minute specks of tetrahedrite, which often causes an apparent specimen of galena to run up in the hundreds of ounces of silver. Quite a number of claims are located along its croppings, but very little work so far has been done. Three claims on this lode have been sold this season to a Vancouver company, who as soon as practicable will work and develop them.

"About six miles from this place is Copper Creek, where a number of claims are located. The claim 'Southern Cross' is located here, and is pronounced a valuable mine.

"A face of mineral from three to six feet wide shews itself up and down the mountain. Upon the eastern side of this some very fine prospects are shewn, the 'Lost Chief' shewing a face 6 by 4 feet of mineral. A drift, 17 feet, has been made on the outcrop, and 10 tons of fine average ore are piled and laid on the dump. During the past season a tunnel was driven 75 feet at an angle across the country rock to tap the lead 50 feet in depth from the upper drift. The Smelting Syndicate at Revelstoke offer from $50 to $114 per ton for the ore (which is argentiferous galena) delivered on the banks of the Columbia, some twenty miles by pack trail. This location is in clay slate and mica shist, having an iron-stone casing on either side.

"Some distance from the 'Lost Chief' there is a small water-way discovered, and named 'Deception Creek,' during the last season. Its waters form one of the south forks of the Spillemcheen River. Two lodes, supposed to be the continuance of the last-named vein, have been discovered and 15 locations made. One lode is argentiferous galena; the other is sulphide ore, having bismuth as a base.

"In taking a retrospective view of the past 5 years, when but a few hardy pioneers were exploring the rugged mountain sides in their quest for mineral wealth, travelling hundreds of miles with their food upon their backs, weary and footsore from the long and weary marches, no trails, no roads, no railways nor steamboats, unknown and unassisted, with very little knowledge of the minerals they were seeking, and, as it has been proved since, actually passing, re-passing, and overlooking some of the rich ledges now located by others who knew more and fared better, benefited by their trails and pathways, it is really astonishing that even so much is known of the country or so much actual work performed. Since that time a railway has been constructed, steamboats placed upon two large rivers, and the Government have met the wants of the miner, the merchant, and the inhabitants by making waggon roads and trails, and at the crossing of the rivers constructed bridges of the most substantial material and good workmanship, so that food and powder, &c., two of the first articles required in mining, can be obtained at fair and reasonable rates, enabling those to develop the riches that for so many ages have lain hidden from view, and to reap a rich reward from their laborious undertaking.

"Every month which passes adds knowledge to our surroundings, and it does seem that Kootenay is blessed with all kinds of minerals. Not far from Golden iron ore has been found assaying 75 per cent., and of the best quality, with a mixture of silver and tin. Three miles from the same place good prospects for coal are in view, work on which is now being performed upon the supposed seams. Four claims were recorded the other day carrying 40 and 50 per cent. of zinc. Slate of good quality is close by; and a mountain of the very best lime rock is now being worked, supplying the local market, one mile from Golden.

"In conclusion I must state that from the progress made this last summer in the development of its mineral wealth, combined with new channels of trade and commerce opened, it has made success an assured fact—in the near future—for this highly favoured district of the Province of British Columbia.

"I have, &c.,
(Signed) "STEPHEN REDGRAVE,
"*Recorder, &c.*"

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE, CLINTON, B. C.,
"December 21st, 1889.

"SIR,—I have the honour to enclose herewith mining statistics, and my annual mining report, for the District of Lillooet for the year 1889.

"The total yield of gold (ascertained from reliable sources only) is $60,364. This shows a falling off of nearly $30,000 as compared with the ascertained yield of last year.

"The decrease in yield, apparently, must be in the neighbourhood of Lillooet. Mr. A. W. Smith, the principal buyer of gold there, writes to me that 'mining in the vicinity during the 'past season has been less prosperous than usual; that is, there has been less done. I believe 'those engaged in it have done as well as formerly, but water in some places has failed, and 'that has caused a shortage in the yield. Another cause is, many of the Chinese have left to 'work on the railroad, and others to work on farms, and many have returned to China from 'this vicinity during the past year, so that at present there cannot be half the number of 'Chinese here that there were a year ago. There are, I think, seven Chinese companies on 'Cayoosh Creek, about fifty men. They have all done well—better, I think, than an average 'of former years. I have bought only $39,000 since last December, all from Chinese labour 'except about $400.' (Mr. Smith's purchases of gold last year were nearly $60,000.) Mr. Phair, Revenue Collector, also calls my attention to an exodus of the itinerant Chinese miners on the banks and bars of Fraser River, and estimates the decrease in their numbers at four-fifths as compared with the past two or three years.

"A company obtained a lease of certain abandoned mining ground on Cayoosh Creek in the early part of the year. They have been steadily at work on it during the season, with what success I cannot say, as the foreman declined to give me any information.

"A company has also bought the farm at the old ferry near Lillooet for the purpose of mining it. They worked on it for a month or two this fall, and are, I understand, quite satisfied with their purchase. Another company has also bought a farm a short distance below Lillooet, also on the west side of the river, for a similar purpose, but as they came into possession late this fall, I believe they have not done any actual mining. On the leased ground of the Fraser River Cable Company there has not been any work done this past season. The available water supply owned by the company was very low during the whole of the mining season. I am still without any information from the lessee on St. Mary's Creek.

"The Chinese miners on Cayoosh have found gold on the banks of the Creek, which they have been working this fall. The alluvial mining in this creek and on its banks will pay well, I have no doubt, for many years to come. Comparatively but little mining has been done on Bridge River and its tributaries during the past season.

"*Quartz.*

"There were 53 mineral locations recorded in the district during the past year, but only a small number obtained a certificate under the provisions of the Mineral Act.

"Everything connected with the Foster Gold Mining and Milling Company's claims on the Big Slide has been at a standstill during the past year. This remark also applies to the locations in the eastern portion of the district, with the exception of the claim on Mad River, North Thompson, which has been worked during the summer months, but I am unable to say to what extent. Of the various locations in the valley of Cayoosh Creek but little work has been done with the exception of the Bonanza Company, which has been at continnous work, up to a short time ago. This company has run a tunnel of nearly two hundred feet, but without any valuable results so far.

"Work has been continuous during the season on the ledge at the west end of Anderson Lake, referred to in my report of last year. New locations have also been made in that neighbourhood, which will be thoroughly prospected next year.

"I regret exceedingly my inability to report more favourably on mining matters in my district for the past year. The Chinese miners are reduced to a very small number. Of white miners there have been but very few for a number of years past, and during the past two seasons those few have turned their attention almost exclusively to quartz mining, and so far, I regret to say, their labour has not added to the returns.

"For the precious metals, the district is to-day practically unprospected, with the exception of a few isolated spots, and even in those very imperfectly. In conversation with Dr. Dawson, of the Canadian Geological Survey, a short time ago, he pointed out that all that portion of the district bounded by the Fraser River, the Lillooet-Clinton and Marble Cañon Waggon roads and Hat Creeks as, in his opinion, very likely to contain the precious metals. I have my doubts if even one really practical and observant prospector has been over any portion of it. A still larger and equally unknown area lies on the west side of the river, bounded on the north by the Chilcotin, west by the Cascades proper, east by the river—say fifty miles square. I sincerely trust that both the localities indicated will at least have a commencement made on them next year.

"I have, etc.,
(Signed) "F. SOUES,
"*Gold Commissioner.*"

"*To the Honourable Jas. Robson,*
"*Minister of Mines, Victoria.*

---o---

YALE.

Kamloops Division.

MR. HUSSEY'S REPORT

"KAMLOOPS, 8th January, 1890.

"SIR,—I have the honour to enclose my annual mining report for the Kamloops Division of Yale District for the year 1889.

"*Stump Lake Mines.*

"Of the large number of claims located in this camp assessment only has been done on a majority during the past season. Several causes have led to this result, but the principal one was the closing down of the Star Mining Company, followed by the burning of the quartz mill and the destruction of other machinery connected therewith.

"The 'Mary Reynolds' claim, owned by Mr. John Hepburn & Company, has now three shafts—one 100 feet, one 75 feet, and one 35 feet—all on the same vein. Several drifts are also run from the 100-foot shaft a distance of 90 feet. From this claim 3,500 lbs. of ore have been shipped to San Francisco, and the encouraging result of $168 per ton has been obtained. There are said to be $10,000 worth of ore on the dump, averaging from $50 to $60 to the ton.

"On the 'Jenny Long,' 'Silver King,' 'Silver Queen,' and the 'Star' Company's claims nothing more than assessment work has been done during the past season. The principal development work done has been on the 'Joshua,' 'Tubal Cain' and 'King William' ledges, owned by the Nicola Milling and Mining Company, L'd. (foreign), which run through Mineral Hill, Stump Lake.

WORK DONE ON THE 'JOSHUA.'

Main double compartment shaft	400 feet.
Air shaft connecting with 100-foot level	85 "
Drifts on 100-foot level	175 "
Drifts on 200-foot level	220 "
Drifts on 300-foot level	350 "
Total	1,230 feet.

WORK DONE ON THE 'TUBAL CAIN.'

Main double compartment shaft	220 feet.
Air shaft connecting with 50-foot level	40 "
Drifts on 50-foot level	160 "
Drifts on 116-foot level	300 "
Drifts on 220-foot level	200 "
Tunnel connecting with 116-foot drift	290 "
Tunnel to connect with 220-foot drift	400 "
Total	1,610 feet.

WORK DONE ON THE 'KING WILLIAM.'

Main double compartment shaft	175 feet.
Air and other shafts	75 „
Drifts 100-foot level	180 „
Drifts 175-foot level	102 „
Total	532 feet.

"On the other mineral claims owned by the above company considerable prospecting work has been performed, aggregating about 200 feet of shafts and a large number of open cuts; and on the 'Joshua,' 'Tubal Cain' and 'King William' horse whims have been used for hoisting purposes. As the reduction machinery contemplated by the Nicola Mining Company, L'd., is of large capacity and will require a large outlay of capital to ensure a permanent supply of ore, they are putting in a steam hoist so as to sink the 'Joshua' 200 feet deeper and run drifts on the 500-foot and 600-foot levels.

"The lodes have strengthened with depth, and the quantity and value of the ore have steadily improved. The prospects are most encouraging for paying results as soon as reduction works are erected at the mines.

"The amount of work done on Mineral Hill by the Nicola Mining Company, L'd, far exceeds that by any other company in British Columbia, and it is to be hoped success will soon crown the efforts of this company, as it will not only have a beneficial effect on quartz mining in this district, but will also attract capital to other legitimate mining enterprises in other portions of the Province.

"At Stump Lake several good locations have been made, from which samples of ore have been taken assaying very high. Owing to lack of capital the claims are not thoroughly developed.

"Messrs. J. M. Forney and E. H. Covey have located mineral claims in the vicinity of Eagle Pass, and expect to be able to induce capitalists to develop the mines.

"*Placer Mining.*

"The placer mines on the Tranquille Creek are still being operated by Chinese exclusively. No definite information can be obtained as to the quantity of gold secured. These mines support about thirty Chinese, who are supposed to make about one dollar per diem during the mining season.

"*Coal.*

"Some development work has been done this season on the coal seams near Kamloops; not sufficient has been accomplished, however, to say whether the find will pay to work.

"In conclusion, I must express my unbounded confidence in the future of this district as a mineral country. Its development may be slow for a time, yet, with the production of bullion, confidence will be inspired and development encouraged.

"I have, etc.,
(Signed) "FREDERICK HUSSEY,
Gold Commissioner.

"*To the Honourable Jno. Robson,*
"*Minister of Mines, Victoria.*"

Okanagan Division.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE,
"VERNON, 18th December, 1889.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the Osoyoos Division of Yale District.

"*Cherry Creek.*

"Very little has been done in the way of mining on this creek during the summer, several of the Chinese having left for other parts of the Province, where they think steady wages are more profitable than prospecting under difficulties, with little promise of success.

"The Cherry Creek Mining Company are still running their tunnel into the hill, with good indications ahead that they will soon strike the channel, but whether productive or not time only will show.

"Mr. Donald McIntyre, in company with Mr. L. W. Riske, has been busily employed this summer erecting a quartz mill on their claims, situated on the Monashee Mountain, and I am informed that they have a quantity of rich free milling ore on the dump ready to commence crushing as soon as the mill is completed, which they expect will be in running order early in the spring. Great credit is due to the indefatigable manner in which Mr. McIntyre has for the last twelve years worked in developing these mines.

"The Hidden Treasure Mining Company on Cherry Creek, I hear, have done little prospecting this summer.

"*Mission Creek.*

"Three white men and seven Chinese have been working on this creek in a desultory manner during the summer, with poor results.

"*Rock Creek.*

"I have heard very favourable reports from the McKinney Camp. Mr. John Douglas, manager of the Douglas Mine, has struck a very rich body of ore—free milling—at a depth of 150 feet from the surface, and is now running cross drifts. He contemplates placing machinery on the claim next summer, as he is now confident that he has a good paying mine.

"The Cariboo Mine is also turning out very rich ore, and the owners intend to put up machinery as soon as a waggon road is built from the boundary line to the camp. On the other claims just sufficient assessment work has been done to hold them. There are in all about twenty-five represented claims at this camp.

"At the mouth of Rock Creek there are about six whites and twenty Chinese working, taking out small wages. The Hydraulic Mining Company have done a great deal of work in getting their claim opened up, and have expended in the neighbourhood of $15,000 for that purpose. In consequence of a severe frost setting in, the company were unable to wash up, which was a great disappointment to the shareholders, who were anxious for some returns after the heavy expenditure on their claim.

"*Okanagan Camp.*

"This camp is situated about twenty miles from Penticton. There are about sixteen claims taken up and represented by the holders putting on assessment work.

"One claim, the 'Wide West,' was bonded for $45,000, but, from what I can learn, the parties are unable to come to a settlement for want of funds.

"The Government, at an expense of $2,000, built a waggon road this year from Penticton Landing to connect with the In-ka-nip-Rock Creek sleigh road, which is a great boon to the miners and settlers, enabling them to get supplies into the settlement by teams in place of pack animals.

"*Siwash Creek.*

"This creek is situated on the west side of Okanagan Lake, running through a portion of the N. Kam-ap-lix Indian Reserve.

"There was quite an excitement over these diggings during the summer, with the usual results, owing to exaggerated reports. A number of claims were staked off and recorded, and as quickly abandoned.

"There are in all about twelve companies prospecting, sinking shafts, and running tunnels into the hills through the gravel with small prospects. The only paying claim at present is the Discovery Company. They have washed up about $1,500 for their summer's work, which, after deducting expenses, will leave them with a small dividend.

"I have, &c.,

(Signed) "W. DEWDNEY,

"*Gold Commissioner.*

"*The Honourable John Robson,*
"*Minister of Mines, Victoria, B.C.*"

"*Similkameen Division.*

MR. HUNTER'S REPORT.

"GRANITE CREEK, October 31st, 1889.

"SIR,—I have the honour to forward the annual mining statistics for the Similkameen Division, in which you will observe that the yield of gold exhibits a decrease from that of the previous year, principally owing to the unusually dry season and consequent scarcity of water.

"On Granite Creek the majority of claims are paying fair wages. Two companies, the Gladstone and Pogue, have been prospecting their claim nearly the whole season, but are now on fair pay.

"Collins Gulch is fairly worked out, although a few miners are still employed there.

' On Slate Creek mining was at a standstill on account of the scarcity of water, but late rains have enabled miners to resume work.

"On Boulder Creek very little has been done, for the same reason.

"The dry season made it most favourable for mining on the Tulameen, and considerable work has been done. A large number of Indians from the Fraser River have been engaged in mining by means of rockers and have made good wages; they are scattered along the Tulameen River, above Bear Creek.

"On the Similkameen good pay was obtained from the creek claims, but dry diggings were a failure from the want of water.

"Very little has been done during the past year in quartz mining, the owners of mineral claims having satisfied themselves with merely performing the necessary work to hold them. Want of means in this instance, as in many others, is the sole excuse for the little labour expended on them.

"I have, &c.,
(Signed,) "HUGH HUNTER,
"*Recorder.*"

"*The Honourable Minister of Mines,*
"*Victoria.*

COAL.

The following table shows the output of each year from 1874 to 1889, inclusive:—

Year.	No. of Tons.
1874	81,000
1875	110,000
1876	139,000
1877	154,000
1878	171,000
1879	241,000
1880	268,000
1881	228,000
1882	282,000
1883	213,000
1884	394,070
1885	365,000
1886	326,636
1887	413,360
1888	489,300
1889	579,830

REPORT OF THE INSPECTOR OF MINES.

"NANAIMO, B. C.,
31st January, 1890.

"SIR,—I have the honour, in pursuance of the 'Coal Mines Regulation Act,' as Inspector of Mines, to respectfully submit for your consideration my Annual Report for the year ending 31st December, 1889.

"During the year the following collieries have been in operation, namely:—

"Nanaimo Colliery, of the New Vancouver Coal Mining and Land Co., Limited.
"Wellington Colliery, of Messrs. R. Dunsmuir & Sons.
"East Wellington Colliery, of the East Wellington Coal Co.
"Union Colliery, of the Union Colliery Co.

"Very extensive and encouraging prospecting operations, involving a large outlay of capital, have been carried on by the above-named companies, and also by the Oyster Harbour Coal Company, during the present year, by means of diamond drills of great power (capable of boring to 4,000 feet), to prove and establish an extension of the Nanaimo coal fields, and also those of Comox; and the Tumbo Island Coal Company are prospecting their coal land on the island of that name in the Gulf of Georgia by sinking a shaft.

"The output of coal for the year 1889 amounted to 579,830 12/20ths tons, produced by the several collieries as follows:—

Nanaimo Colliery	output	223,870	18-20ths tons.
Wellington Colliery	"	273,383	14-20 "
East Wellington Colliery	"	51,372	"
Union Colliery	"	31,204	"
Total output in the year 1889		579,830	12-20 "
Add coal on hand 1st January, 1889		10,922	15-20 "
Total coal for disposal in 1889		590,753	7-20 "

"The exports of coal by the same collieries in 1889 amounted to 443,675 tons, viz.:—

Nanaimo Colliery export	179,286 tons.
Wellington Colliery "	197,510 "
East Wellington Colliery "	43,089 "
Union Colliery "	23,790 "
Total coal exported in 1889	443,675 tons.*
Add home consumption in 1889	124,574 5-20 tons.
" On hand 1st January, 1890	22,504 2-20 "
	590,753 7-20 tons.

*Several cargoes of anthracite coal, hauled over the Canadian Pacific Railroad, and shipped from Vancouver, B.C., to San Francisco, Cal., are obviously not included in this total of exports.

"The coal exported from Nanaimo, Departure Bay, and Comox, was shipped principally to San Francisco and ports in California: other shipments were made to Oregon, Alaska, Petropavloski, Hawaiian Islands, China and Japan (per C. P. R. steamers). H. M. navy and U. S. war and revenue vessels have been supplied with coal, and ocean mail steamers and other vessels calling for fuel.

"The returns of the collieries show about 124,574 tons under the head of 'home consumption' in 1889, as against 115,953 tons in 1888; but it should be understood that the coal used in the collieries is in the most instances included in such returns.

"The following statement of output and export of coal from 1887 exhibits a very gratifying rate of progress by the coal industry of British Columbia in the year 1889; viz.:—

	Output.	Export.
1887	413,360 tons	334,839 tons.
1888	489,300 "	365,714 "
1889	579,830 "	443,675 "

"In previous reports I have presented statements of the various sources with quantities of their supply of coal to the State of California, our chief foreign market, and the following shows the same from 1887:—

	1887. Tons.	1888. Tons.	1889. Tons.
British Columbia	324,949	345,681	417,904
Australia	155,649	271,612	408,032
England and Wales	91,248	126,167	32,890
Scotland	12,615	10,680	12,727
Eastern States (anthracite, &c.)	24,102	30,118	18,950
Puget Sound	569,710	568,948	372,514
Coos Bay and Mt. Diablo	39,155	81,194	87,600*
Japan	——	13,808	1,340
Total	1,217,428	1,448,208	1,351,957

*Coal from Mt. Diablo added since former reports.

"The above table affords a view of the standing of British Columbia in our best market, and the prospects are that the Province will maintain the position which the superior quality of its coal commands, for the future.

"I can truly say that the outlook and productive power and resources of the Province at the beginning of the year on which we have entered appear brighter and more promising of substantial success and prosperity, so far as the coal industry is concerned, than ever before.

"NANAIMO COLLIERY.

"The coal in this colliery was in good demand up till the last two months, when the mines had to stop work, owing to there being no ships to take away the coal.

"No. 1 Pit, Esplanade, in Nanaimo.

"This mine, forming part of the Nanaimo Colliery, belongs to the New Vancouver Coal Mining and Land Company, Limited. The working in this pit is by what is known as the No. 1 and No. 3 North Levels. The No. 1 Level is in a north-westerly direction about one mile, and in this district of the mine there has not been much coal mined during the past year; but there has been some extensive prospcting done, and the company, to all appearance, is going to be rewarded for their perseverance, as they have now got into thick coal, that, from the prospect and regularity of the seam, I think, will prove to be a large and profitable coal field; they have now got into this coal 200 yards, and it averages about seven feet thick, clean and hard. The great part of the coal got out of the mine in the past twelve months came from No. 3 North Level, and in this Level they have the prospect of getting into the same coal soon that they have got in No. 1 Level.

"Ventilation in this mine is very good. When I was down in December I found 49,000 cubic feet passing per minute for the use of 60 men and 14 mules. The motive power of the above air is a Murphy Fan. There is very little gas now found here, the mine being free from dust; and there are pipes to conduct water where required.

"No. 3 Pit (Chase River).

"This shaft takes its name from being near to the mouth of Chase River; it is about two and a half miles from Nanaimo and forms part of the Nanaimo Colliery. The coal in this mine has been, and is at present, hard and of a very good quality, although varying in thickness from four to ten feet. All the workings are by way of a slope starting from near the bottom of the shaft, the levels branching from the slope. The coal is worked here on what is termed the pillar and stall system, for which it seems well adapted.

"Ventilation is very good; motive power, a large fan on the top of the up-cast shaft. When I last inspected this mine there were 46,800 cubic feet of air passing per minute for the supply of forty-six men and twelve mules, and it is well conducted into the face by brattice or otherwise. This mine has been free from gas since it started; the mine is also free from dust, being wet throughout. In this mine, as in all the other mines of the Nanaimo Colliery, a deputation of men is sent to examine the mine, under section 79, General Rule 31. The finding of the condition of the mine is recorded in a book kept for that purpose, and a notice is put up where all may see it.

"South Field Mines, Nos. 1 and 2.

"These mines are now known as the South Field Mine, both places being worked into each other and have jointly one ventilating shaft.

"During the past year a few men have been taking out coal along the outcrop of the No. 1 tunnel, but the bulk of the coal came out of the No. 2 slope. This slope is down over 700 yards with an easy grade until approaching near the face when it goes off with much greater pitch. About one-half of the output of Nanaimo Colliery came from this mine. The coal is of very good quality, and from a series of bore holes put down from the surface to the coal, some distance ahead of the working, they have proved that they have a great extent of coal yet before them. This is also mined on the pillar and stall system. There is now a long range of stalls in good coal.

"Ventilation is very good; motive power a large fan on the up-cast shaft. This mine is ventilated on the separate split system, with two divisions to the east side and one to the west side of the slope, the intakes being the Nos. 1 and 2 slopes with a shaft between the two slopes for the return. The last time I was down this mine I found that there were 67,500 cubic feet of air going past per minute for the use of 74 men and 7 mules. There is very little gas found in this mine, and it is free from dust, being damp throughout. Here the workmen also take the privilege of section 79, General Rule 31.

"No. 4, SOUTH FIELD MINE.

"This is the New Slope mentioned in a former report, situated about half a mile in a southerly direction from No. 3 Pit. They have gone to a great expense here. The slope is now down about 700 yards, the coal being thin in some places, and at other times no coal; but it was reasonably expected that good coal would be found as in No. 3 Pit, coming towards this slope the coal was hard and from five to nine feet thick; it is, however, to be hoped that they will come on the coal soon.

"NORTH FIELD MINE, NANAIMO COLLIERY.

"This is the northern part of the estate, owned by the New Vancouver Coal Mining and Land Company, Limited, and is situated in Mountain District. In the year 1888 the company put down a series of bore-holes to the coal, and among them was one near to their boundary line, which adjoins the Wellington property; the prospect they got seemed to justify them in putting down a shaft The contract was taken by Mr. R. Scott to find the coal. Great preparation was made, clearing away timber and levelling off the surface, and a steam engine was erected. Everything being in order, work was commenced in the shaft on the 8th January, and continued without any great stoppage or drawbacks, when, on the 31st July, coal was struck, the same as is known both here and in California as the Wellington Coal. This was at the depth of 424 feet from the surface. In passing through the coal they found that it was of very good quality and hard; there were three plys of coal with rock between them, making about seven feet of coal. The shaft was continued until they got down 445 feet from the surface. Everything having been got in order both on top and at bottom they then started in the coal, when they found they had a small fault; but now that they are getting fairly started with levels and a slope opening out to both sides they find that the coal varies in thickness from three feet eight inches to four feet four inches, and is very hard and of a good quality. They have got out a few thousand tons of the coal and it looks well. When Mr. Scott had the shaft finished he received charge of opening out the mine, which is to be carried on, on what is called the long wall system; and it appears as if it should work well, as the roof is stronger than the roof of this vein generally is.

"Ventilation is good; motive power, a fan on the Murphy principle. The last time I was down there were only four men in the mine, so that they had the fan running slow; but at that time there were 10,000 cubic feet of air passing per minute. There has not yet been any explosive gas found in this mine and everything is being done to make the workings as safe as possible.

"The shipping place from this mine will be Departure Bay Point, where a large wharf has been erected by the company, so that the largest ships may load at any stage of the tide. From this wharf to the mine, with sidings, there are five miles of railway of standard guage. There is also a railway in connection with the Esquimalt and Nanaimo Railway.

"In starting a new work like the North Field Mine, a large outlay of capital is required, and it is desirable that the enterprise shown by the company will meet with the success that it deserves financially; it will also give new life to this district. I may here be permitted to remark that the prospect of the company for coal in their several mines for the coming year exceeds any that I have ever seen them have, and I trust that it will continue so.

"WELLINGTON COLLIERY.

"No. 3 PIT, WELLINGTON COLLIERY.

"This is the pit mentioned in a previous report as being in the valley of the Millstone River, and, as I have stated in former reports of this mine, is all by the way of a slope on the south side of the shaft.

"The coal was worked on the pillar and stall plan, which is the general method in this colliery. There are now very few stalls being worked, but there is considerable mining being carried on at the pillars, which will last for quite a long time, as the pillars are fully one-half of the coal.

"Ventilation is very good. When I was last down, in December, upon taking it I found that there were 40,000 cubic feet of air passing per minute for the use of 37 men and 6 horses. This mine is ventilated on the separate split system, going direct down the slope and returning by way of the pillars and stalls; motive power, a large fan. In ordinary times there is little gas found, but sometimes, when the roof breaks when they have taken out the pillars, then considerable gas comes away. When, however, there is the least danger the men are sent out of the mine. Here, as in the other extensive mines of the Wellington Colliery, a deputation from the men goes through the mine once a month, to examine all the mine to know its condition as to its safety, and the result of their examination is recorded in a book which is left open so that any person may see it.

"No. 4 PIT, WELLINGTON COLLIERY.

"This pit is put down on the top of the bluff which overlooks the Millstone River Valley. They have been working steadily here the greater part of the year. The coal is worked from what are known as the north and south side workings. All the working in this mine has been on the pillar and stall principle, excepting a small place in the south side, which is now back again to the old style. The coal generally in this extensive mine has been very good, yet the mine has not been without its faults. This mine and No. 3 pit are connected at different places with open roads from one to the other, that is, on the south side. Beside the connection they have their fan shaft, by which men could be taken out if emergency required it.

"Ventilation is very good; motive power, a large fan on the top of the up-cast shaft, worked by a steam engine. This mine is ventilated on the separate split system—the two main divisions at the shaft and again further in the workings. The workings here are very extensive, spreading over a great area, but the air is well kept under control by the overman, so that one district is not overdone at the expense of another. After the air has travelled round its several districts, it is again merged into one volume, and then ascends the up-cast shaft. Sometimes I find the air passing a given place at the velocity of 1,500 (one thousand five hundred) feet a minute, and the last time I was down, in December, I found that there was 110,000 cubic feet of air passing per minute for the use of 150 men and 10 mules and horses.

"This mine gives off some gas, which comes from the roof where they are taking out pillars, but it is not allowed much chance to collect. The fireman, in going his rounds in the mine, seldom finds any gas in the stalls. The mine is free from dust, as there is throughout the mine, where they may be required, a regular system of pipes, so that water can be turned on at any time, either to lay dust or in case of fire.

"In addition to the overman and fireman, there is a staff of men called shot lighters. They use and have only safety lamps to ascertain if a place is safe and if a shot is properly prepared before they will light it. In this mine there is a monthly examination by a deputation of workmen made in the manner before described.

"No. 5 PIT, WELLINGTON COLLIERY.

"This is the only pit of the Wellington Colliery which has a railway connection with the Esquimalt & Nanaimo Railway, and it plays a good part in supplying the Victoria market with this famous coal. This is now about the most extensive mine in the district. The coal is brought to the shaft from the east and west levels incline from the south, and a slope on the north side. In all those places the coal has been and is now very good, and they send out fully 500 tons in one shift. The workings here have all been on the pillar and stall principle, except a small piece in the slope, which seems to work very well.

"Ventilation is very good, and well conducted into the face and where they are taking out pillars (coal) by brattice or otherwise. When I was down in December I found that the instrument registered 118,420 cubic feet passing per minute, that is to say: 45,230 on the east side, 51,460 on the west side, and 21,730 cubic feet per minute passing in the slope, but the above mentioned currents of air are again divided further in in the workings, so that each district will have fresh air. The total number of men employed here on one shift is 195, and 14 mules. This mine is free from dust, and no expense is spared to keep it so. They have a regular system of water works or pipes to take water to any part in the mine where they think it may be required, and, as I have said in a previous report, the mains are along the levels and main roads, with small pipes and hose to the stalls, with sprays of water blown off at different

places in the mine, the air carrying the moisture along, so that everywhere it is not only damp but wet in top, bottom, and sides. The pipes are supplied with water from a large reservoir on the surface, the pressure being the depth of the shaft—260 feet.

"This mine is examined monthly by a deputation from the miners here, and chosen by them, to look into and examine every part of the mine under the section and rule already referred to.

"No. 6 PIT, WELLINGTON COLLIERY.

"This pit was mentioned in a former report as No. 6 Sinking Shaft, and about 900 yards east of No. 4 Pit. They continued at work without anything serious happening, when, about the 1st of May, coal was struck at the depth of 340 feet from the surface. The coal was found to be 8 feet thick, very hard, and of the usual good quality of the Wellington seam. Since that time they have been opening out to all sides, and have now got quite a distance away from the shaft all around. They are mining on the pillar system, as this seems to be adapted to the purpose, all things being considered. The coal has proved to be very regular and good, some places not quite so thick, but other places much thicker. This is now a valuable mine, and is proving an acquisition to this district, there being a large number of men working here.

"Ventilation is good; motive power, a steam jet, but they are now preparing to erect a fan. They are at present restricted to a certain number of men, so that the output of coal is small to what it will be in a short time, as they are mining with all haste to get a connection with their No. 5 Pit. Then we may expect to see the output of No. 6 Pit come to the front, for, from what can be seen, they have here got the coal to work on.

"No. 2 SLOPE, WELLINGTON COLLIERY.

"This is a new mine started by Messrs. Dunsmuir & Sons in the Sabiston and Horne property in Mountain District, and to the east of the East Wellington Colliery. This slope is now down 150 yards. At the top they soon got into the coal, which was about five feet thick, good quality and hard; but after going some distance they got down through it, which put the coal away below the line of the slope which continued in the rock. They now again expect to get into the coal soon. If it is as good and as thick as it was above the fault, and there is no reason why it should not be, it will make a valuable work in this locality, as it is not far from Nanaimo.

"EAST WELLINGTON COLLIERY.

"This is the property of the East Wellington Coal Company. In this colliery there are two shafts, known as No. 1 and No. 2 Pits, although both are connected by their workings underground. By the windings of those works they are 1400 yards apart, but by a direct course they are only about half a mile distant. The No. 2 is west of No. 1.

"In the west side of the No. 1 shaft they are not now doing much mining, as they are only employing a few men, coal being thin. What coal they do take out is of a first-class quality, with a strong roof, well adapted for long wall work, which has been their method of working since they started. In the east side they have during the past year done much prospecting, which is looking favourable for having good coal on this side, although they have drifted through considerable bad and barren ground.

"On August 24th there was a serious fire in this shaft. Everything went on as usual until away in the afternoon, when volumes of smoke came out of the shaft, shortly after followed by flames. Then it was apparent that the ventilating furnace had set fire to the timbers of the shaft, and in a short time the head gear was on fire, and a large bin of coal near the same, while the machinery and boilers were only a few yards off. The men were got out by No. 2 shaft, that being afterwards covered and thus shutting off the air from below. By this time the fire engine was brought out from Nanaimo, and after placing it in the bed of the Millstone river they commenced work. It then became evident that the fire on top was not going to last long. As soon as possible they got No. 1 shaft covered, and in this way the fire was put out. Considerable damage was, however, occasioned by the fire burning out some of the shaft timbers, and also to the head gear, which took a few weeks to put in working order.

"No. 2 Pit, East Wellington Colliery.

"In this Pit work has been going on steadily all the year, except for a few days when the fire was at the No. 1 Pit. The coal here has kept good and continues so. The roof, however, is not quite so strong, yet it is well adapted for long wall work, and this is the system that has been generally worked here.

"Ventilation is good. Motive power up to the time of the fire was a furnace with a steam jet; since that time it has been a fan, worked by a steam engine, that does its work very well. When I was down in December, I found 20,000 cubic feet of air passing per minute for the use of sixty men and six mules,—this being the air and men of both Pits, No. 2 being the intake and No. 1 Pit the outlet. This mine gives off some gas, but chiefly when the roof breaks. As the air goes along the coal face the gas has not much chance to collect and the works are well filled up. Every precaution is used to prevent accidents of any kind.

"UNION COLLIERY, COMOX.

"You will have seen in a former report that this colliery is the property of the Union Colliery Company. Their present mines are only a few miles from the flourishing Comox settlement.

"In this property the coal is exposed in various places, and at present they are mining at three different places and in two veins of coal.

"No. 1 and No. 2 tunnels go into the hill, being adit levels on the south side of the railway. They are in about 500 feet each, coal being about the same quality, which is very good and hard and on an average three feet thick. This is worked on the long wall system. The roof is very strong.

"Ventilation is good; motive power a furnace, the air going in by the level road and coming out by the way along the face of the workings. There is no gas found in here. The mine is free from dust, being wet throughout.

"No. 1 Slope, Union Colliery.

"When previously reporting on this slope I stated it as being down 1000 feet. It is now extended to about 2,000 feet. They have been considerably troubled with faults of one kind and another. The coal, when free from faults or troubles, is about four feet high, of good quality and very hard. The workings from this slope are at the present time by four levels, one to the south side, and three to the north side. In some of these levels the regularity of the coal has been and is still improving as they go in.

"Ventilation is good; motive power a fan on the upcast shaft, built on the Murphy principle and driven by a steam engine. The last time I was down there were only three or four men in the mine, and they had the fan running slow, as it was not required at the time to go fast, yet I found that there were 20,000 cubic feet of air passing per minute. This mine gives off some gas, but it has got very little chance to accumulate. There is no dust in this mine, which is wet throughout. Everything is in good order.

"No. 1 Shaft, Union Colliery.

"This shaft is about half a mile south of No. 1 Slope and is about forty feet deep. There has been much prospecting done at this place, but they do not seem to have got right on the coal yet, although it has much improved of late, and to all appearance they will get on to a good seam soon.

"In this district the coal has not yet proved to be quite as thick as was expected, but the quality is all that could be desired. It is to be hoped that the company's expectations will be fully realized and that the coal may get thicker. They have put down to the coal a series of bore-holes. These bore-holes are away ahead and to the dip of the Slope. In some of those holes they found a good and encouraging prospect. After the large expenditure of money here, and in view of the outlay still required to prove the property, it would be a serious matter for the Province as well as for the Company if these mines were not a success; but it is only a question of a short time in my belief, judging from the indications, when these mines will be successful and when there will be flourishing collieries in this district of Comox.

"TUMBO ISLAND COAL MINING COMPANY.

"This island, lying at the south east entrance of the Straits of Georgia, is being prospected for coal by the above named Company. They commenced by putting a bore-hole down close to the water's edge; in this they passed through about five feet of hard coal. This prospect so encouraged them that they went down to the dip and started to sink a shaft, in which they are now down fully 100 feet. They have a steam engine, pit head gear, and other necessary appliances. Owing to the location of this shaft being so far to the dip of the bore-hole they do not expect to get to the coal at less than about 600 feet from the surface. This is a large undertaking, and will take a large amount of capital to reach the coal and put everything in order. It is to be hoped that when they get the shaft down they will find the coal as good as expected.

"PROSPECTING.

"There has been some very extensive boring in this district during the past year. Amongst them was the continuation of the bore-hole referred to in my previous report in No. 2 Esplanade Shaft. This was put down to the depth of 1,263 feet, the depth of shaft being 617 feet, makes the total from the surface 1,880 feet. From not having struck any coal, there was another bore-hole put down by the same company in the South Field. In this bore they passed through a seam of hard coal 12 feet thick, at 469 feet from the surface. This bore has been continued till the present time, and is 1,460 feet down. This bore shows a good prospect, and is very encouraging.

"OYSTER HARBOUR COAL COMPANY.

"Exploration with two diamond drills has been in progress at Oyster Harbour and Chemainus Bay during nearly the whole of this year. The first bore, commenced in January, was put down at the head of Oyster Harbour, on the north-west side, and pierced a depth of 1,300 feet through sandstone and shale, and was stopped in a fine-looking sandstone. The rocks at this place are tilted at a high angle, the cores from the bore showing a dip of some 25 degrees. While in process of boring, inflammable gas extended from this hole in sufficient quantity to burn with a bright flame when a match was applied.

"A second bore was started on the eastern side of the harbour, which, after going down 690 feet, was stopped for want of water. The stream which fed the drill dried up and the machinery was removed.

"A third hole was bored on the north-west side of Chemainus Bay, close to the water's edge. This hole was sunk to a depth of 1,600 feet, using up all the rods available, and operations were suspended. The rocks, as shown by the cores, which are sandstone, mostly, with shale bands, are all said to be of the right kind, and we may expect to hear more of operations in this neighbourhood.

"At Chemainus Bay, after getting down 300 feet, about the measures were found to be lying horizontally, and very nicely bedded the whole depth of the bore.

"ACCIDENTS

"IN AND ABOUT THE COAL MINES FOR THE YEAR ENDING 31ST DECEMBER, 1889.

"January—7th—George Brough, mule-driver, had his leg broken by getting jammed by empty cars in No. 1 Shaft, Nanaimo Colliery.

"January 18th—Albert Williams, runner in South Field, had his leg broken by being jammed with loaded cars.

"January 24th—Samuel Wariting was slightly injured through being jammed between two cars in No. 5 Pit, Wellington Colliery.

"February 1st—Henry McPhee, miner, was injured about the head by a fall of rock from the roof while at work in his stall in No. 3 Pit, Nanaimo Colliery.

"March 8th—Harry Croston, miner, was slightly injured by a fall of coal from the roof, while at work in No. 5 Pit, Wellington.

"March 16th—Alexander Marshall, sinker, when being hoisted up the North Field sinking shaft, fell from the bucket and was killed.

"March 27th—Joseph Thompson, runner in No. 1 Shaft, Nanaimo Colliery, had his hand jammed while lowering a car on an incline.

"March 27th—Gustav Karsola, miner, was slightly injured by a fall of top coal, when at work in his stall in No. 5 Pit, Wellington.

"March 30th—James Shearer, miner, working in East Wellington Colliery, had his jaw broken by a fall of rock from the roof.

"May 10th—Thomas Beard, miner, was injured by a fall of rock from the roof, when at work in his stall in No. 4 Pit, Wellington.

"May 10th—Thomas J. Jones, miner in the East Wellington Colliery, was injured by coal falling on him while at work.

"May 11th—Patrick Nearn, runner in No. 1 Shaft, Nanaimo Colliery, was injured by a run of cars.

"May 14th—Yung (Chinaman), tracklayer in No. 1 Slope, Union Colliery, had his back injured by a piece of rock falling on him while removing a prop.

"June 12th—John Campbell was injured in No. 4 Pit, Wellington Colliery, by being jammed between timber and cars.

"June 24th—Thomas Lonk, miner, was slightly injured by a fall of rock while at work in his stall in No. 4 Pit, Wellington.

"June 25th—T. Knight, miner, had his wrist broken by getting it jammed between a car and a prop in No. 3 Pit, Nanaimo Colliery.

"June 28th—Leopold Dispeniteance, miner in No. 4 Pit, Wellington Colliery, was severely injured by a fall of coal from the roof, while at work in his stall.

"July 6th—Wilkinson Richards, contractor in No. 3 Pit, Nanaimo Colliery, had his back broken by being jammed in the shaft between the cage and mid-wall.

"July 9th—Nesto Newman, miner in No. 5 Pit, Wellington Colliery, was injured by coal thrown from a shot.

"July 16th—George Phillips, mule-driver in No. 5 Pit, Wellington Colliery, had his collar-bone broken by the cars, while taking in timber.

"August 9th—M. Bart, miner in Union Colliery, was slightly burned about the face and hands, by firing powder while charging a shot.

"August 20th—Westley Harvey, miner, was burned on the face and hands by an explosion of gas in the No. 1 Slope, Union Colliery.

"August 26th—William Gordon, sen., a miner working in No. 3 Pit, Nanaimo Colliery, had one leg and wrist broken and otherwise injured by a fall of coal while at work.

"August 27th—W. Dooley, miner, had his leg broken by a run of cars in No. 1 Slope, Union Colliery.

"August 30th—Thomas Lathom, miner, was slightly injured by a fall of coal and dirt, while at work in No. 4 Pit, Wellington.

"September 27th—William Foxworthy, tracklayer at South Field Mine, had several of his ribs broken by getting jammed with a run of empty cars.

"October 5th—M. Campbell, miner, had the small bone of his leg broken by a fall from the roof, while at work in No. 4 Pit, Wellington Colliery.

"October 12th—John Dunsmuir, miner in No. 3 Pit, Nanaimo Colliery, was hurt about the back by a fall of coal.

"October 25th—Ah Loon (Chinaman), runner in the Union Colliery, had his thigh dislocated while pushing cars.

"October 30th—Ah Yeut (Chinaman), fell from a trestle near No. 1 Tunnel, Union Colliery.

"October 31st—The above-named Ah Yeut died this day from injuries received.

"November 7th—Sandretto, a miner in No. 4 Pit, Wellington Colliery, was injured by being jammed by a car, which he accidentally started away while loading.

"November 13th—William Brown, miner, was seriously injured by a fall of top coal on him while at work in his stall in No. 4 Pit, Wellington Colliery.

"November 16th—John Wesley, miner in No. 5 Pit, Wellington Colliery, was injured by a fall of coal from the top, while at work in his stall.

"November 22nd—George Codling, miner in North Field Mine, Nanaimo Colliery, was killed by a fall of rock from the roof. He went in to the face after having fired a shot which blew out some timber, and while in the act of putting the timber up the roof fell on him.

"November 23rd—William Anthony Farman, miner, was slightly burned on the face and hands by an explosion of gas in No. 1 Slope, Union Colliery.

"December 16th—John Aitken, shot lighter, in South Field Mine, Nanaimo Colliery, was severely injured about the back by a fall of rock from the roof when about to fire a shot.

"December 20th—The above named John Aitken died to-day from the injuries received.

"December 19th—Casueir Colate, runner in No. 3 Pit, Wellington Colliery, had his thigh bone dislocated by a car running on to him when at work.

"I am sorry to have to make out such a numerous list of accidents, both serious and fatal. There were thirty-three reported as serious, yet there were some of those so slight that the injured parties were at work in a few days; on the other hand, there are one or two persons that are injured to such an extent that it is doubtful whether they will ever be able to resume their mining occupation again.

"The fatal accidents were four in number—two of them by falls of rock; one by falling from a bucket when being hoisted up a shaft; and one by falling from a trestle.

"Of the serious accidents in the list, thirteen were caused by cars in the mine; six by falls of rock; nine by falls of coal; two by shots; one in a shaft; and two by explosions of gas.

"I have inquired into all the circumstances which attended all these accidents, and in nearly all instances went and saw the place when I knew the place had not been disturbed, and even then in some cases I went.

"Public inquest was held whenever requisite, at which all the evidence it was possible to obtain was taken, and as the depositions and proceedings of the inquiries so held are filed in the Attorney-General's Office I beg leave to refer you to the same.

"With respect to all the accidents, I could not discover that any blame or negligence could be attached to any one. You will perceive, when looking at the list, that nearly all the accidents took place when the men were working and where they were presumed to be skilful enough to know, at their several classes of work, when they were in immediate danger, subject to the direction of the overman, fireman, shot firer, and any other person in authority from the Manager; and as the shot firer and fireman are continually travelling from one place to another, they would in the course of their rounds be sure to have anything that they saw to be dangerous made safe.

"You will also notice from the list of accidents that, with the exception of two persons being slightly burned in the Union Colliery, there has not been a casualty from gas in this district, which says a great deal for the management and ventilation of the Collieries.

"Now that the workmen in all the extensive mines send a deputation by and chosen from themselves to examine every part of the mine (See section 79, General Rule 31), the Managers furnishing them with all the necessary appliances required to make a complete examination, so that no place need be missed, the workmen obtain a knowledge of the mines as to their condition with regard to safety, as the result of those inspections is posted in a conspicuous place where all may see it.

"As Inspector, I am always ready to attend to any matter that may be brought to my notice by any one who may have a cause of complaint.

"I will now conclude my report, hoping that the year we have entered on may be free from any serious accident, so that all may, by using the greatest care and not running any unnecessary risk, be saved from injury, and also hoping and trusting that this may prove a prosperous year to our mining industry and the workmen alike.

"Appended are the Annual Colliery Returns, also Examination Questions which were put to candidates for certificates as Colliery Managers by the Examiners under the provisions of the Act. It has been thought that the publication of the questions at the last examination would prove useful as showing intending candidates the nature and scope of the examination for certificates of Colliery Manager.

"I have, &c.,
(Signed,) "ARCHIBALD DICK,
"*Government Inspector of Mines.*

"*The Honourable the Minister of Mines.*"

COLLIERY RETURNS.

NANAIMO COLLIERY RETURNS.

Output of Coal for 12 months ending December 31st, 1889.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1889.		No. of tons unsold, including coal in stock, Jan. 1st, 1890.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
223,870	18	40,113	11	179.286	—	5,121	14	9,593	1

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
697	16	.....	162	$2 to $4	$1	.....	$1 to $1.25.
Total hands employed..... 875				Miners' earnings per day .....$3 to $4.			

Name of Seams or Pits—South Field No. 2, South Field No. 3, No. 1 Esplanade Shaft, and No. 1 North Field Shaft.

Value of Plant—$350,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—South Field No. 2. worked by slope; seam 6 to 10 feet; South Field No. 3, worked by shaft; seam 5 to 10 feet; No. 1 Esplanade Shaft, worked by shaft; seam 5 to 12 feet; No. 1 North Field Shaft, worked by shaft; seam 4 feet 6 inches.

Description and length of tramway, plant, &c.—Railway to South Field, 5 miles with sidings; railway to No. 1 Shaft, 1 mile with sidings; railway from North Field Mine to wharf at Departure Bay, 4½ miles; rails are of steel, 56 pounds per yard of standard gauge, viz., 4 feet, 8½ inches; 8 hauling and pumping engines; 12 steam-pumps; 4 locomotives; 150 coal cars (6 tons), besides lumber and ballast cars; fitting shops for machinery repairs, with turning lathes, boring, drilling, planing, screw-cutting machines, hydraulic press, steam hammer, etc., etc., diamond boring machinery for exploratory work (bores to 4,000 feet); wharves, 1,070 feet frontage, at which ships of the largest size can load at all stages of the tide

SAMUEL M. ROBINS,
Superintendent, The New Vancouver Coal Mining Co., Limited.

WELLINGTON COLLIERY RETURNS.

Output of coal for 12 months ending December 31st, 1889.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1889.		No. of tons unsold, including coal in stock, Jan. 1st, 1890.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
273,383	14	76,524	14	197,510	—	3,701	1	3,050	1

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
750	12	.....	100	$2 to $3.75	$1 to $1.75	.....	$1 to $1.25

Total hands employed ....862 | Miners' earnings, per day.....$3.50 to $4.50

Name of Seams or Pits—Wellington.

Value of Plant—$150,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—4 shafts with slopes, airways and levels; 3 air shafts; seam 6 to 10 feet thick.

Description and length of tramway, plant, &c.—12 miles of railway; 6 locomotives; 250 coal waggons; 13 stationary engines; 9 steam-pumps; 4 wharves for loading vessels, with bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY RETURNS.

Output of coal for 12 months ending December 31st, 1889.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1889.		No. of tons unsold, including coal in stock, Jan. 1st, 1890.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
51,372	—	7,636	—	43,089	—	100	—	547	—

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
175	3	.....	12	$2.25 to $5	$1 to $1.50	.....	$1 to $1.37

Total hands employed ....190 | Miners' earnings, per day ....$3 to $5

Name of Seams or Pits—East Wellington No.'s 1 and 2 Shaft.

Value of Plant—$140,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—1 seam from 2½ feet to 7½ feet; 7 levels; 2 shafts.

Description and length of tramway, plant, &c.—4½ miles standard narrow gauge; 2 locomotives; 31 4½-ton cars; 2 hoisting engines; 2 donkey engines; 1 steam pile driver; 1 steam saw-mill complete, capacity, 12,000 feet per day; 4 steam pumps.

EAST WELLINGTON COAL CO.

UNION COLLIERY RETURNS.

Output of coal for 12 months ending December 31st, 1889.	No. of tons sold for home consumption.	No. of tons sold for exportation.	No. of tons on hand 1st January, 1889.	No. of tons unsold, including coal in stock, Jan. 1st, 1890.
31,204 tons.	100	23,790	2,000	9,314

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
132	.....	.....	182	$2.50 to $4	.....	.....	$1 to $1.25

Total hands employed .....314 | Miners' earnings, per day.....$3.50 to $4.50

Name of Seams or Pits –Union.

Value of Plant, $25,000.

Description of seams, tunnels, levels, shafts, &c., and number of same—1 slope with airways and levels.

Description and length of tramway, plant, &c.—11 miles of railway, 4 feet 8½ inches gauge; 2 locomotives; 50 coal waggons; 1 diamond drill; 4 engines; 2 steam pumps; two wharves; one steam saw mill.

JAMES DUNSMUIR.

EXAMINATION QUESTIONS,

At Examination of Candidates for Certificates as Colliery Managers, held by the Examiners in Nanaimo, under the provisions of the "Coal Mines Regulation Act."

MINING ACT.

1. What does the Act provide in reference to the employment of boys and young persons in coal mines?

2. What are the requirements of the Act with regard to the working place?

3. State the provisions of the Act as to the payment of persons employed in the mines by weight.

4. What is the prohibition in the Act as to single shafts; and what is provided by the Act as to the division of the mine into parts?

5. What does the Act say respecting abandoned mines and workings?

6. State fully what the Act provides in regard to ventilation.

7. What distance does the Act require the brattice to be kept from the face of the working place?

8. What does the Act say as to safety lamps and lights?

9. What kind of safety lamp do you consider the best? Give fully your reasons why.

10. State the restrictions and precautions to be observed under the Act in the use of gunpowder and blasting in mines.

11. What are the requirements of the Act with respect to man-holes on self-acting inclines and other roads?

12. What are the duties of the Overman and Fireman as provided by the Special Rules?

13. What does the Act say as to the examination of machinery, shafts, &c.?

14. What precaution should be taken in approaching a place that is likely to contain a dangerous accumulation of water or gas?

15. How are dusty or fiery mines to be ventilated? What are the precautions to be observed in blasting, according to the Mining Act?

GASES.

1. What is the composition and weight of the following gases: Atmosphere, Nitrogen, Oxygen, Carbonic Oxide, Carbonic Acid, Fire Damp, and Sulphureted Hydrogen? State their properties, how made or produced, and how they can be detected?

2. What are the gases chiefly met with in coal mines?

3. What proportion of air is required to render Fire Damp explosive; what proportion is required to give it its greatest explosive power; and what proportion of air is required to render the mixture non-explosive?

4. Describe a Barometer, and Thermometer, and their use in denoting changes in the atmosphere.

5. To what extent are gases and vapours expanded by heat?

6. What is meant by White Damp; how is it given off, and what peculiarities has it?

7. What is meant by the diffusion of gases?

8. What effect has the combustion of lights on the air of a mine?

9. How would you ascertain if a working place or sinking shaft contained Fire Damp or any other obnoxious gases?

VENTILATION.

1. What are the different powers used in ventilating mines, and which do you prefer?

2. What precaution would you take when putting in a furnace against its taking fire and igniting the surrounding strata?

3. What is a dumb drift, and what are its uses in ventilation?

4. If there are 10,000 feet per minute (of air) passing along an air-course, the size of which is 6 feet by 7 feet, at what velocity is it travelling?

5. Assuming 5 feet per second to be the proper velocity for air to travel, what must be the size of the road when the quantity of air amounts to 24,000 feet per minute?

6. If 20,000 feet per minute of air be passing in a mine and it is proposed to split this into three equal currents along airways of about equal length and area, would the current in each be sufficient to remove ordinary discharges of Fire Damp, the size of the airways being say 5 feet by 6 feet?

7. How is the power of the furnace estimated?

8. Can you give a rule to find the weight of air?

9. How is the useful effect of a ventilating fan obtained by calculation?

10. Describe the water gauge; its use in ventilation.

11. If with 35,000 cubic feet of air per minute the water gauge is 1.8, at what height will it stand when the quantity is increased to 45,000 feet?

12. What is the motive column?

13. What is the motive column under the following circumstances?—

Depth of down-cast and up-cast shaft, 600 feet.
Temperature of down-cast, 45 degrees.
" " up-cast, 140 "

14. What pressure per square foot does a 1.5 water gauge indicate?

15. What is the horse power expended when the ventilating current is 30,000 cubic feet per minute, and the water gauge is 0.65?

16. What quantity of air will there be travelling along an airway, height 5 feet 9 inches and width 9 feet 7 inches; and anemometer registering 230 revolutions?

17. There are 6 splits of air in a fiery mine, as follows:—

No.	Size.	Area.	Vel. per sec.	Quantity.
1	10 x 6		8	
2	8 x 6		8	
3	8 x 6		6	
4	6 x 6		10	
5	6 x 6		8	
6	4 x 6		6	

Fill in the area and of air; find the total quantities passing per minute, and state the size of up-cast required?

18. If 28,000 cubic feet of air pass along an airway 900 yards in length, how much air will travel if the airway be lengthened to 1,500 yards, the pressure remaining the same?

19. If the horse power of a Fan be 36, and 68,000 cubic feet of air per minute is put into circulation, what would be the horse power required, the quantity of air being increased 130,000 cubic feet per minute?

20. What is meant by inertia?

21. What is meant by "rubbing surface?" What is the rubbing surface of an airway 1,272 feet long, 7 feet high, and 9 feet wide?

22. Supposing a Fan to be 40 feet in diameter, width of blade 13 feet, making 40 revolutions per minute, what is the theoretical quantity of air thrown by such a fan, leaving friction out of the question?

GENERAL QUESTIONS ON MINING.

1. If you were in search of coal, how would you endeavour to find it?

2. Describe the various methods of boring for coal.

3. What form of shaft, in your opinion, is the strongest, and what kind are usually adopted?

4. When there is quicksand containing a large quantity of water, what means would you adopt to pass through it?

5. In sinking and opening out a Colliery, what is the principle which should guide in determining the position of the works?

6. Explain the ordinary conditions for adopting the long wall and pillar and stall workings.

7. In a four foot seam of coal, 80 fathoms deep, what size would you make your pillars, having regard to the ultimate extraction of the greatest quantity of coal combined with the safety of the workmen?

8. Under the usual conditions of tram rails and tubs, what is the flattest gradient at which a self-acting incline will pass 100 tons in eight hours? Sketch the best arrangements of it at top.

9. In a seam having a rise of one in six, and the direction of the plane of coal being to full rise, sketch what you consider a good form of Longwall workings, having a regard to the ventilation, direction of the drawing, roads, &c., &c.

10. What is meant by specific gravity?

11. The specific gravity of a piece of coal 1.49, what is the weight of a cubic foot of it?

12. The coal in a pillar measuring 100 yards square has a specific gravity of 1.28; the seam is 5 feet 6 inches thick; the pillar lies 9 fathoms below the bottom of the shaft; what horse power must be exercised to remove the whole of the coal clean and deliver it at the bottom of the pit?

13. Explain the best method of drawing coal along a level road or one not dipping sufficiently to take away the rope.

14. Sketch a pair of levels and the mode to be adopted when approaching water in old workings; and state the number and length of holes you think advisable under 10, 50 and 100 fathoms pressure?

15. Give a good reliable formula for finding the thickness of metal tubing for different depths and sizes of shafts.

16. How would you proceed to obtain the specific gravity of a piece of coal?

17. How would you proceed in case of a fiery and dusty mine to keep the mine in a safe condition from explosions of gas and coal dust? State your idea of coal dust explosions.

18. In the case of a fire making such headway in a mine that you found it necessary to wall it off, how would you proceed?

MACHINERY.

1. What is a unit of work, and how many are there in a horse power?

2. What power is required to raise 8,000 cubic feet of water to a height of 300 fathoms?

3. Explain the use of the syphon; its use and application in mines.

4. How many gallons a minute will an engine of 170 horse power pump from a depth of 210 fathoms?

5. To what height will a pump, whose cylinder is 12 diameter and plunger bucket 3½ in diameter, force water with a pressure of 20 lbs. of steam?

6. Find the nominal h. p. of an engine cylinder, 30 diameter, stroke 4 feet, making 40 revolutions per minute, and 30 lbs. of steam pressure; also give effective h. p. of same, supposing 7-10 to be lost by friction.

10. What is the working load and breaking strain of 1¼ steel wire rope?

11. If the safety valve on your steam boilers was 4 inches in diameter, and the steam blew off at 50 lbs.; length of lever, 36 inches; fulcrum, 4 inches long; what weight would have to be attached to the end of the lever, reckoning lever and valve to weigh 5½ lbs.?

12. Find the situation of the fulcrum along a lever 15 feet in length, on which 2½ cwt. placed at one end may equipoise 30 cwt. at the other, the weight of the lever not taken into account.

13. In what time will an engine of 16 h. p. raise a ton of material from a depth of 170 fathoms.

14. What weight would an engine of the following diminsions lift:—Size of cylinder, 12 inches; length of stroke, 18 inches; steam pressure, 50 lbs.; geared 4 to 1 with drum 6 feet in diameter?

SURVEYING,

1. Plot the following survey and calculate are:—

N. 16	degrees,	40	minutes	W.	Distance,	160	links.
S. 75	"	32	"	E.	"	120	"
S. 69	"	25	"	E.	"	111	"
S. 41	"	3	"	W.	"	85	"
N. 79	"	40	"	W.	"	80	"
S. 53	"	30	"	W.	"	70	"

2. Plot the following survey and calculate area; draw a line from terminal point to place of commencement, and give bearing and distance of same:—

N. 13	degrees,	33	minutes	W.	Distance,	630	links.
N. 30	"	42	"	E.	"	496	"
S. 74	"	0	"	W.	"	440	"
S. 40	"			E.	"	433	"
S. 65	"	0	"	W.	"	512	"

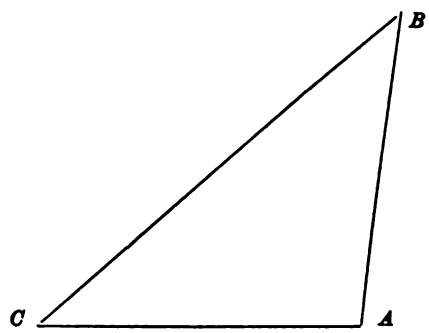
Scale—2 chains equal to 1 inch.

3. Shew how you would head your field-book for levelling.

4. Fill in and work out the following levels:—

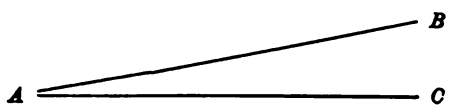
3.50	back sight,	5.65	fore sight,	Distance,	4.60 chains.
4.10	"	10.85	"	"	7.80 "
5.04	"	9.25	"	"	11.60 "
3.84	"	12.91	"	"	15.20 "
4.12	"	7.65	intermediate sight,		
		3.92	fore sight,	"	21.00 "
12.96	"	3.03	"	"	27.00 "

5.



In the above triangle the angles *A* and *B* are given. *A* equals 122 deg. 30 min. 15 sec. *B* equals 30 deg. 20 min. 15 sec. What is the angle *C*?

6. The included angle between the lines *AB* and *AC* is 1 degree; at what distance upon the line *AB* are the two lines 1 link apart, and what distance are they 12 inches?



7. Plot the following notes of a Level Book:—

Back sight.	Intermediate sight.	Fore sight.	Rise.	Fall.	Reduced levels, 100.00 datum.	Distance, chains.
3.50		5.65				4.60
4.10		10.85				7.80
5.04	9.25					11.60
		12.91				15.20
4.12		7.65				17.00
10.49		3.92				21.00
12.96	6.50					25.00
		3.03				27.00

8. What is meant by contour levelling?

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, Printer to the Queen's Most Excellent Majesty.